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Editor

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Editor

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CONTENTS

Page

ETHNOLOGY

Suggested periods in South Island prehistory.
D. R. SIMMONS 1

Anthropomorphic and zoomorphic Maori bowls from Hauraki and the Bay of Plenty.
D. R. SIMMONS 59

"Godstick" head from Katikati.
D. R. SIMMONS 65

The last initiation ceremony at Gupuna, Santa Ana, Eastern Solomon Islands.
S. M. MEAD 69

BOTANY

The *Acaena ovina* (Rosaceae) complex in New Zealand.
A. E. ORCHARD 97

Zingiberaceae in New Zealand.
A. E. ORCHARD 109

ZOOLOGY

Hyphalus wisei sp. n., a new intertidal beetle from New Zealand (Coleoptera: Limnichidae).
E. B. BRITTON 119

The taxonomy of *Benthovoluta hilgendorfi* (von Martens) and allied turbinellid genera (Mollusca: Volutacea).
W. O. CERNOHORSKY 123

Description of new West Australian Mitridae and Vexillidae (Mollusca: Gastropoda).
W. O. CERNOHORSKY 133

A list and bibliography of the aquatic and water-associated insects of New Zealand.
K. A. J. WISE 143

Index 189

SUGGESTED PERIODS IN SOUTH ISLAND PREHISTORY

D. R. SIMMONS

AUCKLAND INSTITUTE AND MUSEUM

Abstract. Analysis of artifact classes suggests that South Island prehistory can be subdivided into major periods of change.

This is a preliminary attempt to deduce a pattern of changes from artifact collections, and to relate that pattern to available information regarding South Island prehistory. The artifacts used range from well-documented assemblages down to surface collections. While fairly definite conclusions are possible when analysis is based on well-documented, excavated assemblages, more tentative conclusions are necessary when using results from the analysis of surface collections that may incorporate material from several layers.

ARTIFACTS AND THEIR ANALYSIS

A basic premise in attempting to analyse artifacts by the methods used here is that even with museum and surface collections patterns of change can be deduced. These would be expected in view of the changing ecology of man in southern New Zealand during the prehistoric period. To quote Clarke, "Thus insofar as a culture is an adaptation to a specific environment, a change in the environment may produce changes in the culture to maintain equilibrium inversely proportional to the culture's technological level." (Clarke 1968, p. 128).

Preliminary analyses of artifact groups indicated that the relationship between different groups resembled that expected from a polythetic model which Clarke defined as ". . . a group of entities such that each entity possesses a large number of the attributes of each group, each attribute is shared by large numbers of entities and no single attribute is both sufficient and necessary to the group membership." (Clarke 1968, p. 37). The observed changes between the groups was of such a nature as to suggest a state of "dynamic equilibrium", an equilibrium which is changing continuously along a trajectory yet maintaining stability at any given moment (Clarke 1968, p. 50). In other words, such changes as were observed, appeared to be cumulative rather than revolutionary. This type of change is again what would be expected given our present knowledge of the nature of changes in the environment of the South Island over the last 1000 years.

Earliest occupation in the South Island can be traced back to the initial East Polynesian settlers of the area. Archaeological evidence on economy can be summarized by saying that, from as early as the 10th or 11th century, hunting of the available genera of moa and other species of forest birds was important (see Simmons 1967, p. 35, 1968, p. 121). Food was plentiful and occupation sites were large, with a full range of activities. From the 12th to the 14th century the economy was still based on forest hunting, with a concentration on a reduced range of moa.

Rec. Auckland Inst. Mus. 10: 1-58 December 17th, 1973

> "Around 1300 A.D. it seems that conditions inimical to the regeneration of rimu, matai and kaikawaka began to develop, became most intense between 1600 and 1800, and had the strongest influence in the east of the South Island . . ." (Wardle 1963, p. 313).

Before this time the island was largely forest covered (Molloy *et al* 1963, p. 74). As moa and forest birds became scarce, more reliance was placed on seashore resources, fish, shellfish and sea mammals (Lockerbie 1959, p. 84). Later, the economy was based principally on fish, shellfish and small birds (Lockerbie 1959, p. 87). This type of economy, with minor variations, continued in Otago until the introduction of potatoes (Hjarno 1967, pp. 43-44, Simmons 1967, pp. 55-56). In Canterbury, kumara were grown as far south as Taumutu, between the Rakaia River and Lake Ellesmere (Shortland 1851, p. 244). The loss of many species of birds was a gradual process and the change from a basic coastal-forest-orientated economy to a basic sea-orientated economy was relatively slow, with a period of adaptation which lasted for at least a century. By contrast, the last major change to a basic potato agriculture economy was swift in Murihiku (Otago-Southland) and accompanied by cultural intrusion, which is clearly recorded at Little Papanui (Simmons 1967). The introduction of kumara agriculture to the northern South Island, probably in the 17th century, was also accompanied by cultural intrusion from the North Island. The North Island origin of the agricultural groups bringing Classic Maori culture is a point that has been made many times (e.g. Skinner 1921, Duff 1956, Hjarno 1967).

This study aims to define the peaks of change in certain material artifacts as one aspect of the cultural system. The original analyses on which this study was based were at first confined to the material from layers at Little Papanui. The method was extended to other sites in the local area, which were connected by the use of identical or apparently similar material and which appeared to be of the same age. When similar results were obtained, the method of analysis was again extended to further sites in Murihiku (Simmons 1967). In this paper a broader study of collections from the entire South Island has been made using the sites listed below and indicated in Fig. 1.

SITES AND SOURCES OF COLLECTIONS USED

Southland

Clifden cache (S167/8) on the Waiau River 96km (60 miles) west of Invercargill. Found together by Mr W. J. Scott on his property at Clifden. Southland Museum.

Pahia (S175/5). 48km (30 miles) west of Invercargill. Collection, associated with moa bone, made by Leslie Mackay from eroding sandhills. Some Classic Maori material from nearby *Pene Bay* could be contained in this collection. Southland and Otago Museums.

Centre Island (—) (Rarotoka), Foveaux Strait. Site of late Maori occupation. Collection by Judge Chapman *c.* 1890. Otago Museum.

Ruapuke Island (—) Foveaux Strait. Centre of late Maori occupation. Southland Museum.

Tokanui Mouth (S183/3) east of Gore. Site of European Maori village (Otara) with earlier occupation on dunes. Southland Museum.

South Otago

King's Rock (S184/6) South Otago. Excavated by Teviotdale and Lockerbie (Lockerbie 1940, 1953, 1954). Otago Museum.

Fig. 1. Map of South Island showing sites.

Papatowai (S184/5) South Otago. Excavated by Teviotdale (1937, 1938a, 1938b) and Lockerbie (1953, 1954, 1959). C14 dates: Layer 1 — A.D. 1185 ± 30, 1195 ± 30; Layer 2 — A.D. 1320 ± 50, 1490 ± 50; Layer 3 — A.D. 1560 ± 80, 1640 ± 60. Otago Museum.

False Island (S184/3) South Otago. Excavated by Lockerbie (1959). C14 dates: A.D. 1480 ± 60, 1605 ± 50, 1630 ± 50, 1660 ± 50, 1735 ± 50. Collection studied mainly surface material. Otago Museum.

Cannibal Bay (S184/4) South Otago. Excavated Lockerbie (1959). C14 dates: A.D. 1500 ± 60. Collection from surface. Otago Museum.

Pounawea (S184/1) South Otago. Excavated by Lockerbie (1954, 1959). C14 dates: Layer 1 — A.D. 1140 ± 60; Layer 2 — A.D. 1400 ± 55; Layer 3 — A.D. 1450 ± 60, 1660 ± 60. Flake material and adzes from two bottom layers. Otago Museum.

Otago

Little Papanui (S164/1) Otago Peninsula. Excavated by Skinner and Teviotdale in 1926-1939 (Simmons 1967). Otago Museum.

Sandfly Bay (—) Otago Peninsula. Excavated by Teviotdale *c.* 1929. Collection by Teviotdale in Otago Museum. Collection by C. Kay held by Mrs Kay, Dunedin. A single layer site.

Tarewai Point (S164/6) Otago Heads. Excavated by Teviotdale (1939a). A European contact period site. Otago Museum.

Anderson's Bay (S164/117) Dunedin Harbour. Excavated by Teviotdale. Collection associated with moa bone. Otago Museum.

Kaikai's Beach (S164/17) Otago Heads. Excavated by Lockerbie (1954, 1959). C14 dates: Bottom layer — A.D. 1050 ± 50 (Hjarno 1967). Upper layer European contact period. Otago Museum.

Murdering Beach (S164/16) Otago Heads. Two sites (Moa-hunter or Ancient Occupation site) on old dunes at back of beach, and recent European contact village destroyed in 1817 on beach flat.
Excavated Skinner in 1929 and Lockerbie (1954, 1959). Collection from Moa-hunter site by P. Pinney. Otago Museum.

Long Beach (S164/20) Otago Heads. Excavated by Dawson and Yaldwyn (1952), Skinner (1953). Lower layer burials with one-piece hooks, middle layer midden containing moa bone, upper layer European contact period. Collection from upper surface layer. Otago Museum.

Karitane (Huriawa) (S155/1) 32km (20 miles) north of Dunedin. Excavation by P. Gathercole and L. M. Groube. A Classic Maori pa site. Collection in Anthropology Department, University of Otago, studied by courtesy P. Gathercole.

Central Otago

Matara (—) near Middlemarch, Central Otago. Collection made by P. George in 1935 from a rock shelter. Otago Museum.

Moa Flat (—) on the Clutha River near Ettrick. Collection from old Moa-flat station made from site on the banks of the Clutha. Associated with moa bone, quadrangular front grip and triangular apex up adzes. Otago Museum.

Glenorchy (S123/7) head of Lake Wakatipu. Collection from Wyuna-Koch site above Glenorchy on an ancient transverse moraine. Excavated in 1967 by Simmons. C14 dates: A.D. 1356 ± 47, 1431 ± 44. Collection made by C. Haines. Otago Museum.

North Otago

Pleasant River (S155/2) North Otago. Excavated by P. Gathercole. Collection, associated with moa bone, in Anthropology Department, University of Otago; studied by courtesy P. Gathercole.

Nenthorn (S145/1) Central Otago, north of Middlemarch. A quartzite quarry. Excavated by M. Trotter (1961). One source of Group 1 and Group 1-2 quartzites (Simmons & Wright 1967). Trotter Collection, Otago Museum.

Shag River (S155/5) North Otago. Excavated Teviotdale (1924) and Hjarno. C14 dates: Layer 1 — A.D. 1127 ± 45, 1105 ± 56. Stratigraphy similar to Pounawea — two layers containing moa bone and an upper layer of shell. Otago Museum.

Mata Kaea (S146/5) Shag Point, North Otago. Excavated by M. Trotter (1965b). No moa bone present. Trotter Collection, Otago Museum.

Waimataitai (S146/2) North Otago. Excavated by M. Trotter (1955, 1965b). C14 dates: (Trotter 1967c) A.D. 1249 ± 47, 1324 ± 30. Trotter Collection, Otago Museum.

Tai Rua (S136/1) North Otago. Excavated by Trotter (1965b) and Gathercole (1961). C14 dates: A.D. 1407 ± 32, 1447 ± 32. Trotter Collection, Otago Museum, and Anthropology Department, University of Otago.

Katiki Point (S146/4) North Otago. A Classic Maori site. Excavated by M. Trotter (1967a). C14 dates: A.D. 1739 ± 56. Trotter Collection, Otago Museum.

Ototara (S136/2) North Otago. Excavated by M. Trotter (1965a). C14 dates: (Trotter, 1967c) A.D. 1422 ± 52, 1483 ± 70. Trotter Collection, Otago Museum.

Waitaki River Mouth (S128/1) North Otago. A very large site covering up to *c.* 50 hectares (125 acres). Excavated by Teviotdale (1939b) and Knight & Gathercole (1961). Collections by Teviotdale, H. S. McCully, M. Trotter in Otago Museum. Main collection held by Stewart Willets, Oamaru, the former owner. The Waitaki cache was found as a unit by Willets.

Oturehua (S134/1) the Becker Quarry above Oturehua, Central Otago. A quarry and working floor for Group 2 quartzite. Excavated in 1967 by F. Leach, Otago University (1969). C14 dates: A.D. 1053 ± 27, 1023 ± 82. Collection studied here was made by Simmons, mainly from one top layer working area in 1966. Otago Museum.

Canterbury

Te Aka Tarewa (S117/6) Waitaki River, Aviemore. Collection, associated with moa bone, made by H. S. McCully. Otago Museum.

Gray's Hills (S109/1) Mackenzie Country. A quartzite quarry. A source of Group 3 and 1-2 quartzites (Simmons & Wright 1967). Collection made by H. S. McCully in 1930. Otago Museum.

Pareora River Mouth (S119/2) South Canterbury. Collections made by C. Griffiths and H. S. McCully. Associated with moa bone. Otago Museum.

Rakaia River Mouth (S93/20) Canterbury. Excavated by Haast in 1870 (1872). Haast Collection, Canterbury Museum.

Bank's Peninsula

Redcliffs (or Sumner) Burials (S84/69) Sumner, Bank's Peninsula. Situated on a former dune line now covered by the main Sumner Road. Excavated by Haast (1875b) and more recently by Duff and Trotter (Trotter 1967b). C14 dates for occupation of a similar type to that recorded by Haast are: A.D. 1163 ± 82.

Redcliffs Cave (Moa Bone Pt Cave) (S84/77) Sumner. Excavated by Haast (1875a), McKay (1875) and Duff (1963). C14 dates for post butts: A.D. 1304 ± 62, A.D. 1310 ± 25. An account of Haast's materials was published by Skinner (1923). Haast Collection, Canterbury Museum.

Monck's Cave (—) Monck's Bay, Sumner. Investigated by Meeson (1890) and written up by Skinner (1924a). Canterbury Museum collection.

Motukarara cache (—) Bank's Peninsula. Recorded by Duff (1940).

North Canterbury

Hurunui cache (—) North Canterbury. Recorded by Duff (1956).

Marlborough

Kapowairua (S10/24-27) Durville I., Marlborough. Site collection in Otago Museum.

Wairau Bar (S29/7) Marlborough. Excavated by Duff (1956) and divided into two main layers — burials and midden layer. C14 dates: midden layer A.D. 1100 ± 50, 1200 ± 50. Eyles and Canterbury Museum collections.

Nelson

Golden Bay (—) Nelson. Surface collections in Otago and Auckland Museums.

Westland

Heaphy River (S7/1) Westland. Excavated by Wilkes and Scarlett (1967). Adzes reported separately by Scarlett (1967). C14 dates: A.D. 1518 ± 70.

Haast River Mouth (—) Westland. Two caches containing mainly large quadrangular front grip and hogback adzes, in Otago Museum.

Anita Bay (—) Milford Sound. Collection made by MacKenzie. Otago Museum.

The presentation of the data from the above sites has been deliberately kept to a crude and non-complex form and no attempt has been made to regularise the distribution patterns. Three classes of artifact were chosen for analysis — adzes, fishhooks and flake tools, because they are ubiquitous and have a continuous distribution in time and space. Items such as ornaments, musical instruments, and several other types of artifact with discontinuous time or space distributions are also included where relevant.

Adzes

Adzes were subject to a multivariable recording system by punch card or code as in Table 1, then analysed to find regularly occurring factors or constellations of factors which delimited a group. Table 1 also includes irregularly occurring factors. The result is 22 forms characterised by a shorthand key based on their most significant features. Invariably, any classification which involves the setting up of type specimens involves an element of choice and attempts to apply it to any artifact collection result in some artifacts being relegated to the "unclassifiable" category or forced into types to which they have only a vague similarity. It was because of such difficulties inherent in the Skinner (1940) and Duff (1956) adze typologies that the present system was adopted for adzes, and later extended to include other artifacts. In this paper, the 16 principal forms employed for classifying adzes are described below (see also Simmons 1967, pp. 13-15).

1. Quadrangular no grip (Figs. 4, 17, 19, 24)
   (a) Cross-section quadrangular or front wider than back.
   (b) Cutting edge straight.
   (c) Length equals two to four times width of cutting edge.

2. Quadrangular no grip greenstone (Fig. 25)
   The same as above but made in greenstone.

3. Greenstone chisel and gouge
   (a) Cross-section quadrangular or circular.
   (b) Cutting edge straight or gouge.
   (c) Length equals four times width of cutting edge.

4. Flake adze
   (a) Cross-section irregular.
   (b) Made from a waste flake.
   (c) No grip.
   (d) Length less than 4cm.
   (e) Length equals two or three times width of cutting edge.

5. Slight spade shoulder (Figs. 15, 28)
   (a) Cross-section lenticular, quadrangular rounded front and back, or rectangular front wider than back.
   (b) Grip produced by hammer dressing or flaking sides but reduction is less than 2mm and no definite shoulder is produced.
   (c) Cutting edge straight or shallow gouge edge.
   (d) Length equals five to seven times width of cutting edge.

Table 1. Record of some factors on twenty-eight adzes, chosen to show the range of factors present.

Form	Cross-section	Shape	Factors
1	Quadrangular	Thick, F = B	H C S
2	Quadrangular	Thin, F = B	H A R
3	Rectangular	Thick, F > B	K B R
4	Rectangular	Thin, F > B	H B Q U
			H D R
			H G S
5	Reversed Rectangular	Thick, F < B	H A P
6	Reversed Rectangular	Thin, F < B	K A S
7	Triangular	Thick, Apex F	H A R
8	Triangular	Thin, Apex F	H A R
9	Truncated Triangular	Thick, Apex F	H B L W X
10	Truncated Triangular	Thin, Apex F	H A R
11	Triangular	Thick, Apex B	K A Q
12	Triangular	Thin, Apex B	H D R
			H D S
13	Truncated Triangular	Thick, Apex B	H B R
14	Truncated Triangular	Thin, Apex B	K D M
15	Semicircular	Base B	K B N W
16	Semicircular	Base F	H A S
17	Diamond		K A Q
18	Triangular	Apex R	K E S
19	Triangular	Apex L	K E S
20	Lenticular		K G N
21	Rounded		H G P
22	Circular		H A M
			K B P

Key

Thick: Width > 2 times thickness
Thin: Width < 2 times thickness
F > B: Front wider than back
F < B: Front narrower than back
Apex F: Apex to front
Apex B: Apex to back
Base B: Base to back
Base F: Base to front
Apex R: Apex to right
Apex L: Apex to left

A No grip
B Front grip reduced > 2mm
C Angled butt > 2mm
D Sides reduced > 2mm marked spade
E One side reduced
F Reduced > 2mm
G Slight spade sides reduced < 2mm
H Cutting edge straight
I ,, ,, skew right
J ,, ,, skew left
K ,, ,, gouge

L Length ÷ cutting edge = 9
M ,, ,, ,, ,, = 8
N ,, ,, ,, ,, = 7
O ,, ,, ,, ,, = 6
P ,, ,, ,, ,, = 5
Q ,, ,, ,, ,, = 4
R ,, ,, ,, ,, = 3
S ,, ,, ,, ,, = 2
T Chin on bevel
U Horns on poll
V Horns on shoulder
W Single horn poll
X Single horn shoulder
Y Ridge on grip
Z Ridge on shoulder

6. Marked spade shoulder (Figs. 5, 14, 22)
   (a) Cross-section rectangular front wider than back or triangular apex to back.
   (b) Grip produced by reduction of sides more than 2mm so as to produce a definite shoulder.
   (c) Cutting edge straight or hollow (gouge).
   (d) Length equals two or three times cutting edge.

7. Greenstone spade shoulder (Figs. 23, 26, 27)
   This includes both marked and slight spade forms in greenstone. Other variables are the same except for a flattening or reduction of thickness in cross-sections.

8. Quadrangular front grip (Figs. 3, 11, 13, 20)
   (a) Cross-section quadrangular or quadrangular front wider than back.
   (b) Grip produced by reduction of the front surface of the butt more than 2mm from the plane of the surface.
   Note. Angled butt forms are also included here though strictly in terms of other variables such as concavity/convexity of front and back, these should be a separate form.
   (c) Cutting edge straight or occasionally gouge (hollow ground).
   (d) Length equals two, or more usually three, times width of cutting edge.
   (e) Other features occurring more rarely are horns on the poll shoulder or chin.

9. Reversed quadrangular no grip (Fig. 6)
   (a) Cross-section quadrangular back wider than front, thick and thin forms.
   (b) Cutting edge straight or occasionally hollow ground (gouge).
   (c) Length equals 5 or 2 times width of cutting edge.
   (d) Front of butt may be angled by flaking, polishing.

10. Reversed quadrangular grip
   (a) Cross-section as above, rarely the thin form.
   (b) Grip produced by reduction of front usually by hammer dressing and rounding of butt section.

11. Triangular apex up grip (hogback) (Figs. 2, 12)
   (a) Cross-section triangular, thick section, apex to front.
   (b) Grip by reduction of front to truncate apex of triangle.
   (c) Length equals nine times width of cutting edge.
   (d) Occasionally single horn on poll or on chin.

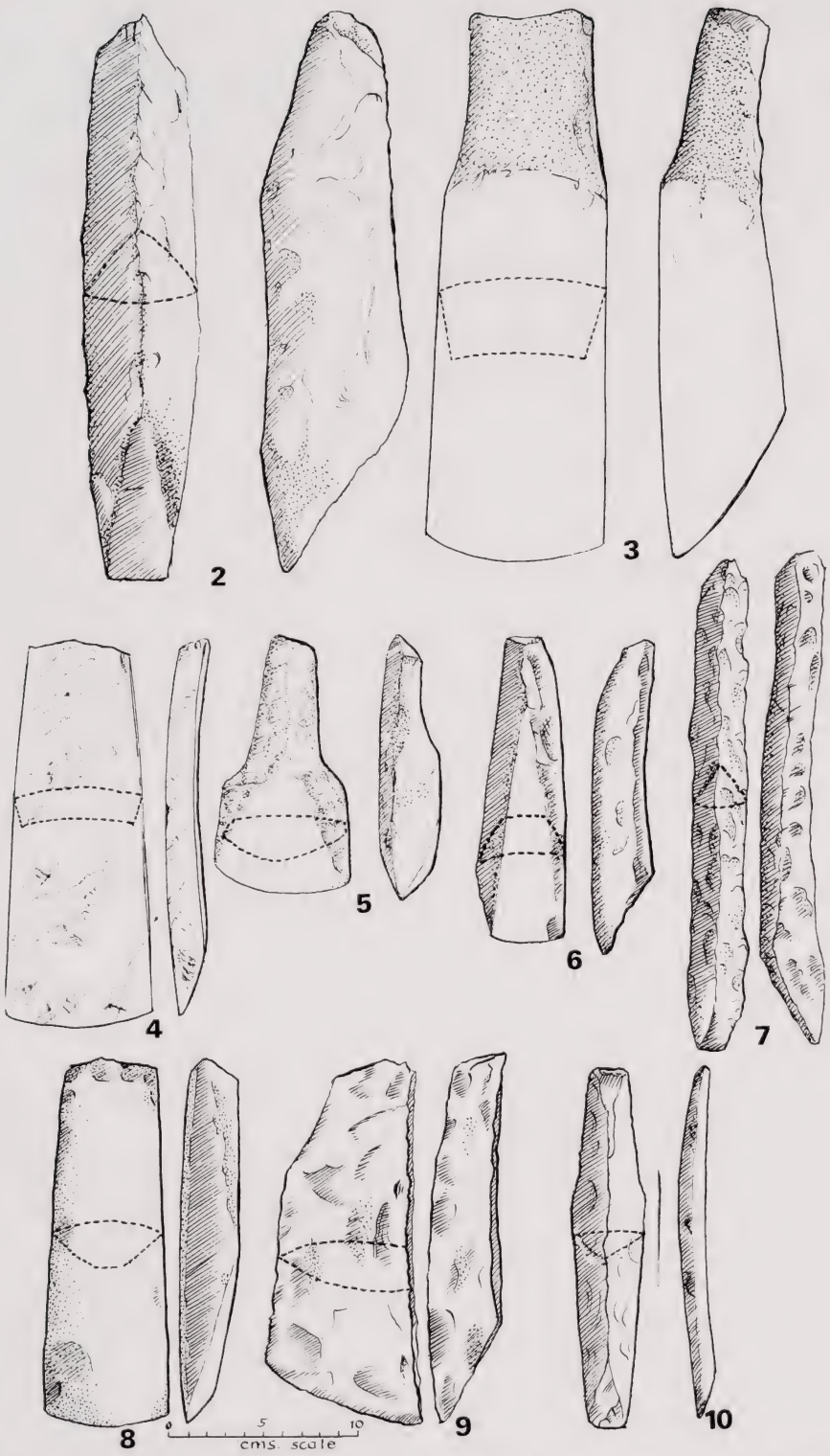
12. Triangular apex up no grip (Fig. 7)
   (a) Cross-section triangular and truncated.
   (b) Cutting edge straight.
   (c) Length equals three times width of cutting edge.

13. Triangular apex down grip (coffin shape) (Fig. 10, 18)
   (a) Cross-section thin triangular.
   (b) Grip by reduction of sides more than 2mm.
   (c) Length equals eight times width of cutting edge.
   (d) Cutting edge hollow ground (gouge).
   (e) In the coffin shape form the width of the shoulders is one and a half times that of the cutting edge, which is narrow for the total length of the adze.

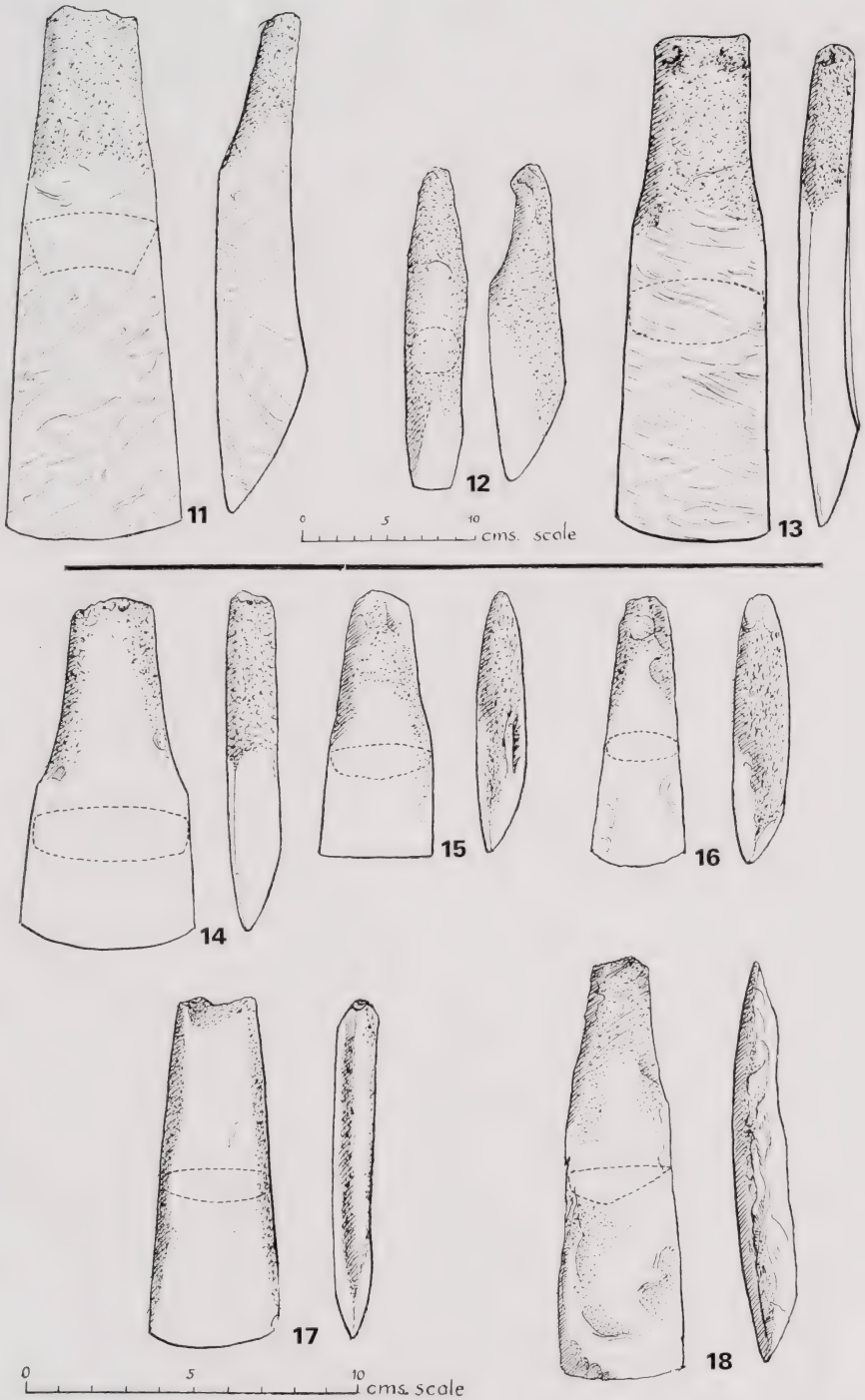
14. Triangular apex down no grip (Fig. 8)
   (a) Cross-section thin triangular.
   (b) Cutting edge gouge usually extending up adze and ending in a point.
   (c) Length equals four times width of cutting edge.

15. Side hafted (Fig. 9)
   (a) Cross-section triangular apex to right or to left.
   (b) Grip produced by reduction of one side to produce a definite shoulder.
   (c) Cutting edge hollow ground (gouge) usually point of bevel is off centre.
   (d) Length equals two times width of cutting edge.

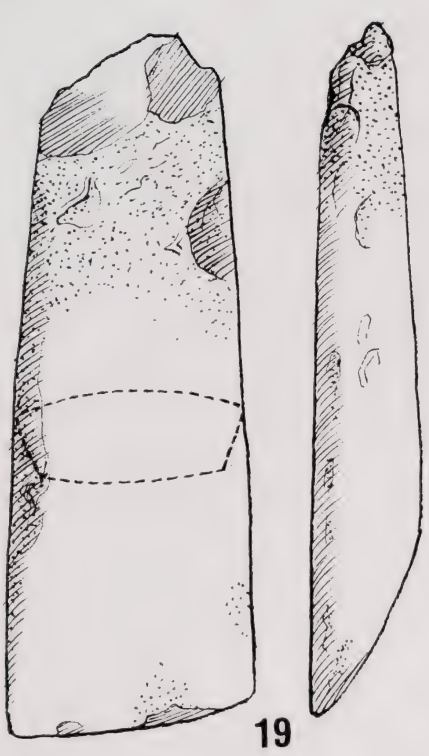
16. Ovoid or semi-circular (Fig. 16)
   (a) Cross-section ovoid, semi-circular, rounded, circular.
   (b) No grip.
   (c) Length equals five to seven times width of cutting edge.
   (d) Total length not more than 7cm.
   (e) Cutting edge straight or gouge.

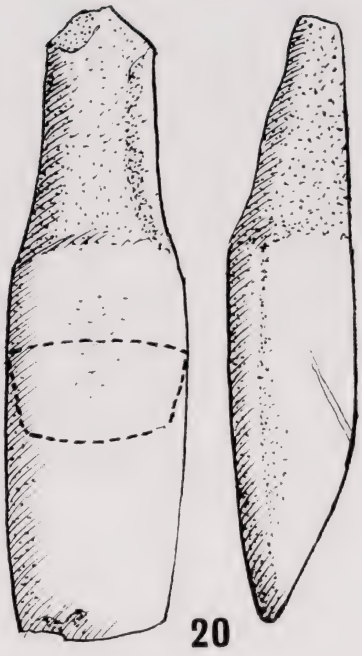


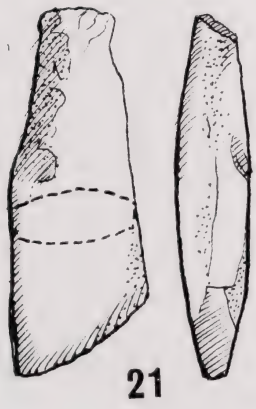
Figs. 2-10. Typical Early Period adzes. 2. Dominant triangular apex up grip, A.M.5846 Long Beach. 3. Dominant quadrangular front grip, A.M.2548.2 Paparoa Inlet. 4. Quadrangular no grip, A.M.23230 Pelorus Sound. 5. Marked spade shoulder, A.M.22433.3 Durville I. 6. Reversed quadrangular, Houhora. 7. Triangular apex up no grip (after Skinner 1938). 8. Triangular apex down no grip, A.M.29607 Normanby. 9. Side hafted, A.M.8277. 10. Triangular apex down with grip (after Skinner 1938) (plan view reversed).

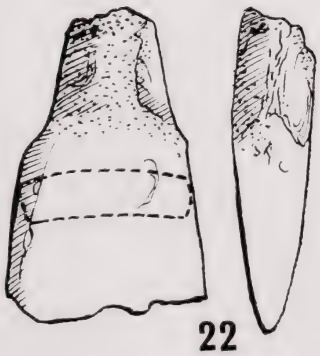


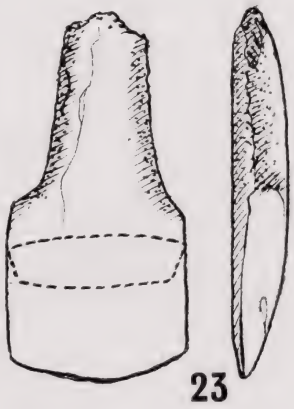
Figs. 11-18. Typical Middle Period adzes. 11. Dominant quadrangular front grip argillite, A.M.25530 Moa Bone Pt Cave (from Haast's excavation on sandhills, Sumner. 12. Dominant small hogback of rounded cross-section, A.M. 30128.2 Southland. 13. Quadrangular front grip in nephrite, A.M.30210. 14. Marked spade shoulder, A.M.7918 Long Beach. 15. Slight spade shoulder, A.M.27217 Tuamarina. 16. Ovoid A.M.28217.3 Otago. 17. Quadrangular no grip, A.M.24997 Akaroa. 18. Triangular apex down with grip, A.M. 30139 Southland.

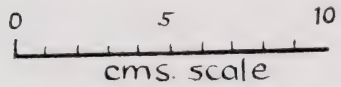




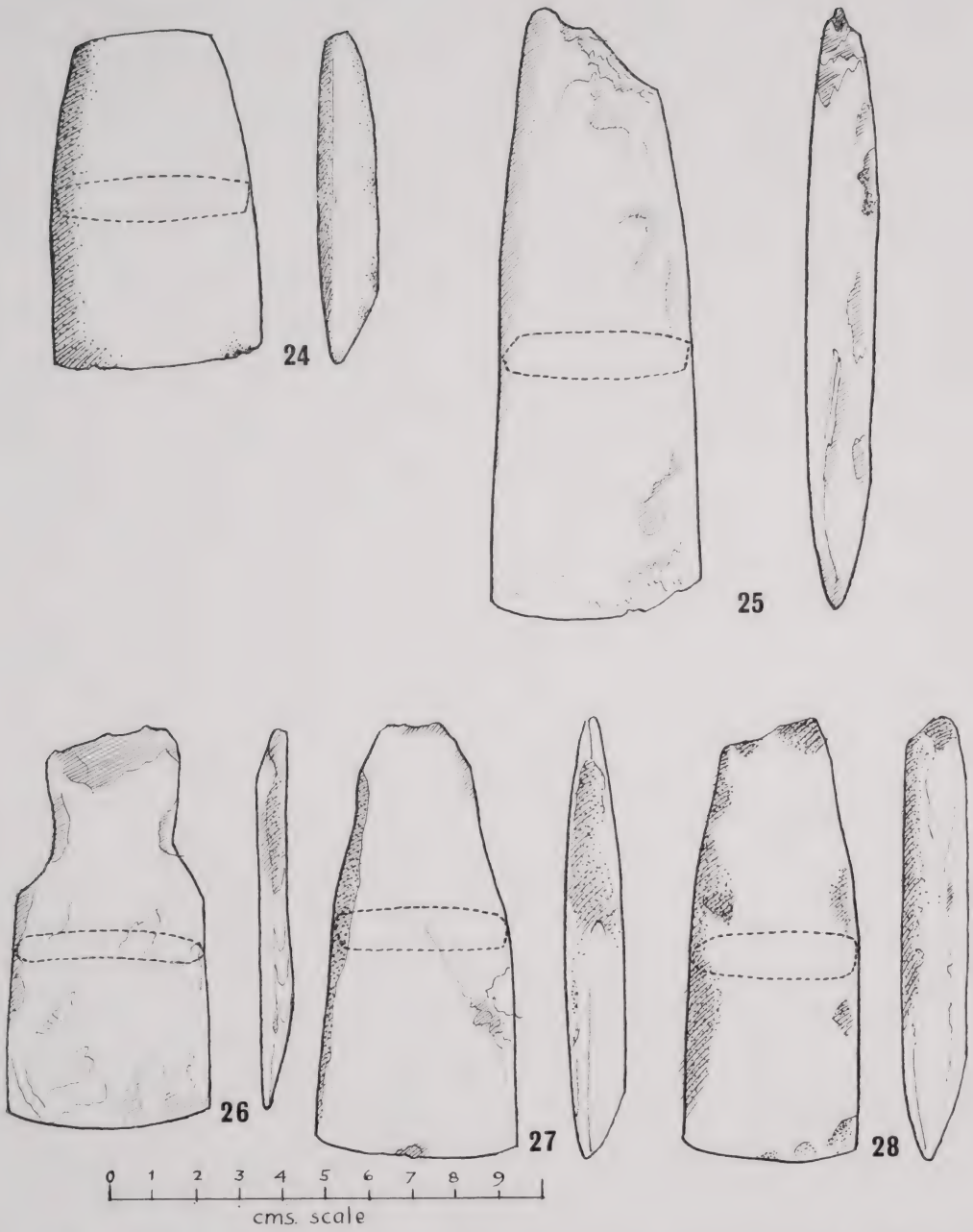








Figs. 19-23. Typical Intermediate Period adzes. 19. Dominant quadrangular no grip, A.M.14586 Ruapuke I. 20. Dominant rounded quadrangular front grip, A.M.16157 Southland. 21. Skew adze with grip on one side, A.M.7944. 22. Spade shoulder in ordinary stone, A.M.1324.7 Southland. 23. Spade shoulder in nephrite, A.M.30138.4 Southland.



Figs. 24-28. Typical Late Period adzes. 24. Dominant quadrangular no grip in ordinary stone, A.M.29353.4 Otira. 25. Dominant quadrangular no grip in nephrite, A.M.5783 Murdering Beach. 26. Marked spade shoulder in nephrite, A.M.5808 Murdering Beach. 27. Slight spade shoulder in nephrite, A.M.5825 Murdering Beach. 28. Slight spade in ordinary stone, A.M.7930 Murdering Beach.

RESULTS OF ANALYSIS

Tables 2 and 3 show the percentage and numerical distributions of these forms in the sites. Groupings became evident during analysis. These were:—

1. Collections with a dominance of Triangular apex up grip adzes. (Fig. 29, e.g. Heaphy, Wairau Bar Midden, Pounawea).
2. Collections with equal dominance of Triangular apex up grip and Quadrangular front grip adzes. (Fig. 29, e.g. Sumner, and the caches at Hurunui and Clifden).
3. Collections with a dominance of Quadrangular front grip adzes in which numbers of Triangular apex up grip adzes are still present. (Fig. 30, e.g. Rakaia, Waitaki, Wairau Bar Burials).
4. Collections with a dominance of Quadrangular front grip adzes. (Figs. 30, 31, e.g. the caches at Motukarara and Haast, Papatowai, Little Papanui bottom, Tokanui Mouth).
5. Collections in which Quadrangular no grip adzes dominate, yet still possess some quadrangular gripped adze forms. (Fig. 32, e.g. Little Papanui middle, Shag R. top, King's Rock).
6. Collections with a dominance of Quadrangular no grip adzes made in greenstone. Fig 33, e.g. Tarewai Pt, Murdering Beach).

During the analysis it became evident that 2 was transitional between 1 and 3, and that 5 was transitional between 4 and 6, leaving four major groups. Reference to C 14 dates for some of the collections in these groupings in conjunction with the typological sequence is also a temporal one.

The various caches were included in the analysis to see if they also reflected the general tendency to change even though the small number involved in each distort the statistics to a certain extent. That the caches do reflect the tendencies of the other collections of their group is shown in Figures 29 and 30.

As far as the percentage distribution of adzes is concerned, the graphs would appear to reflect a state of "dynamic equilibrium", in a continuously changing system.

If the sites are ordered in the same way as in Table 2, then the length range of adzes recorded in Fig. 34 results. For convenience, the median length rather than the mean has been taken to illustrate the dispersion of artifacts within the range. In the total collection, the overall length of adzes in the lower part of the graph (e.g. Heaphy) does not overlap the very long adzes of Waitaki River or Wairau Bar Burials, while in the upper part of the graph length decreases (Fig. 34). The adzes are generally more massive in the mid part of the graph, length is one indication of this.

If the dominant adze classes are taken separately, the same trends are apparent:

(a) Quadrangular front grip adzes tend to include larger examples at Wairau Bar Burials in the middle of the graph. In the upper part of the graph they drop out (Fig. 35).

(b) Triangular apex up grip adzes show a pattern along the same lines (Fig. 36) with long adzes at Waitaki River and Wairau Bar Burials, then becoming rare before becoming absent.

(c) Quadrangular no grip adzes show an unchanging tendency, but are of sporadic occurrence in the lower portion of the graph (Fig. 37). Duff (1956) distinguished between the two ends of this graph by labelling the lower ones Type 2A and the upper group 2B. No real criteria could be established for this division.

Table 2. Percentage distribution of adze forms in South Island sites.

	Quadrangular	Quadrangular	Chisel/gouge	Flake adze	Slight spade shoulder	Marked spade shoulder	Spade shoulder	Quadrangular	Reversed quadrangular	Reversed quadrangular	Triangular apex up	Triangular apex up	Triangular apex down	Triangular apex down	Side hafted	Ovoid	Total adzes	% Greenstone	% Argillite
	no grip	greenstone	greenstone				greenstone	front grip	no grip	grip	grip	no grip	grip	no grip					
Moa Bone Pt Cave	.	54	30	.	.	.	.	.	.	.	.	.	.	.	.	15	13	77	13
Katiki Pt (Trotter)	.	50	50	.	.	.	.	.	.	.	.	.	.	.	.	.	12	100	.
Murdering Beach Classic	15	54	25	4	2	2	5	.	.	.	.	.	.	.	.	2	272	85	1
Tarewai Pt	31	40	15	2	7	3	3	.	.	.	.	.	.	.	.	.	56	56	7
Little Papanui, top layers	52	12	15	12	7	2	2	.	.	.	.	.	.	.	.	.	108	31	1
Monck's Cave	65	.	.	7	.	7	.	14	.	.	7	.	.	.	.	.	14	.	29
Sandfly Bay	29	.	17	17	8	4	8	17	.	.	.	.	.	.	.	.	24	25	0
King's Rock	31	.	.	.	23	16	.	23	.	7	.	.	.	.	.	.	13	23	7
Shag River, top layer	33	16	10	6	10	3	6	13	3	3	.	1	.	.	.	6	31	33	1
Golden Bay	31	.	.	15	11	8	.	14	.	.	4	.	1	7	1	5	98	.	80
Orepuke	36	2	3	15	8	6	.	25	.	.	2	2	.	.	.	2	85	6	50
Little Papanui, middle layers	33	.	10	7	19	10	.	28	.	5	.	.	.	10	.	.	21	.	5
Shag River, bottom layer	14	5	.	16	11	20	.	14	2	.	5	.	.	5	.	8	37	5	3
Pareora River	14	4	12	10	8	2	12	16	4	.	.	4	.	.	.	4	50	28	63
Pahia	19	1	17	7	6	8	1	20	.	1	12	2	1	1	.	3	128	20	4
Tokanui Mouth	15	.	7	22	5	12	2	22	.	1	7	.	.	.	.	7	55	7	.
Little Papanui, bottom layers	7	4	2	16	10	15	1	24	.	3	5	.	.	2	.	1	92	9	2
Papatowai	9	2	.	4	9	4	.	25	2	3	7	7	3	7	.	.	52	4	4
Haast River (cache)	7	.	.	.	.	.	.	14	7	.	7	13	.	7	.	13	15	.	90
Waitaki 1 (cache)	20	.	.	.	.	.	.	40	.	.	20	.	.	20	.	.	5	.	40
Motukarara (cache) (Duff 1940)	3	3	.	.	.	.	.	52	.	.	30	.	6	3	3	3	31	3	97
Wairau Bar Burials (Duff 1956)	38	.	.	3	.	3	.	30	.	.	19	.	3	1	3	3	64	3	88
Waitaki River	12	1	6	8	3	4	1	31	1	1	25	1	3	1	1	1	346	11	45
Rakaia River	7	8	10	10	6	.	3	20	.	.	13	6	6	.	.	3	30	20	43
Clifden (cache)	.	.	.	.	.	.	.	29	.	.	29	14	.	14	.	14	7	0	57
Hurunui (cache) (Duff 1956)	.	.	.	.	.	.	.	32	.	.	32	.	.	12	6	17	17	.	80
Sumner (including Moa Bone Pt Cave dirt beds)	25	.	.	8	3	.	.	18	8	3	18	3	3	3	3	5	38	.	80
Pounawea	3	3.	.	19	3	19	3	22	.	.	25	.	.	.	3	.	28	4	4
Wairau Bar Midden (Duff 1956)	29	.	.	.	.	5	.	15	3	.	24	.	13	7	2	2	132	.	92
Heaphy	30	4	11	.	.	2	.	6	2	.	28	8	.	4	.	6	43	16	84
Wairau Bar total (to show effect of undifferentiated site collections)	18	.	3	27	1	2	1	13	.	2	23	1	2	3	2	3	351	3	90

Table 3. Numerical distribution of adze forms in South Island sites.

	Quadrangular	Quadrangular	Chisel/gouge	Flake adze	Slight spade shoulder	Marked spade shoulder	Spade shoulder	Quadrangular	Reversed quadrangular	Reversed quadrangular	Triangular apex up	Triangular apex up	Triangular apex down	Triangular apex down	Side hafted	Ovoid	Total adzes
	no grip	greenstone	greenstone				greenstone	front grip	no grip	grip	grip	no grip	grip	no grip			
Moa Bone Pt Cave	.	.	7	4	.	.	.	.	.	.	.	.	.	.	.	2	13
Katiki Pt (Trotter)	.	.	6	6	.	.	.	.	.	.	.	.	.	.	.	.	12
Murdering Beach Classic	41	110	79	11	5	5	12	.	.	.	.	.	.	.	.	4	272
Tarewai Pt	20	26	10	1	4	3	1	.	.	.	.	.	.	.	.	.	56
Little Papanui, top layers	53	13	16	13	8	3	2	.	.	.	.	.	.	.	.	.	108
Monck's Cave	9	.	.	1	.	1	.	2	.	1	.	.	.	.	.	.	14
Sandfly Bay	7	.	4	4	2	1	2	4	.	.	.	.	.	.	.	.	24
King's Rock	4	.	.	.	3	2	.	3	1	.	.	.	.	1	.	.	13
Shag River, top layer	10	5	3	2	3	1	4	1	.	.	.	.	.	.	.	2	31
Golden Bay	31	.	.	16	8	11	.	14	.	.	4	1	7	1	5	.	98
Orepuke	31	2	2	12	6	4	.	21	.	.	2	2	.	.	.	2	85
Little Papanui, middle layers	7	.	1	2	3	.	6	.	1	.	1	1	.	.	.	.	21
Shag River, bottom layer	5	2	.	6	4	7	.	5	1	.	2	.	.	2	.	3	37
Pareora River	7	2	6	5	4	1	6	8	2	.	5	2	.	.	.	2	50
Pahia	25	2	23	9	7	10	2	26	1	15	3	2	1	4	.	.	128
Tokanui Mouth	8	.	4	12	3	6	1	12	.	1	.	.	.	.	.	4	55
Little Papanui, bottom layers	5	4	11	15	9	13	1	22	.	3	4	1	.	2	.	1	92
Papatowai	5	1	.	8	5	8	.	13	4	4	4	2	.	.	.	.	52
Haast River (cache)	2	.	.	.	.	.	.	6	1	.	1	2	.	1	.	1	15
Waitaki 1 (cache)	1	.	.	.	.	.	.	2	.	.	1	.	.	1	.	.	5
Motukarara (cache) (Duff 1940)	1	1	.	.	.	.	.	16	.	.	9	.	2	.	.	1	31
Wairau Bar Burials (Duff 1956)	18	.	.	.	.	1	.	19	.	.	12	.	5	6	1	2	64
Waitaki River	28	3	17	29	13	15	5	115	4	3	86	4	10	6	5	6	346
Rakaia River	5	2	3	3	2	.	1	6	.	.	4	2	2	.	.	1	30
Clifden (cache)	.	.	.	.	.	.	.	2	.	.	2	1	.	1	.	1	7
Hurunui (cache) (Duff 1956)	.	.	.	.	.	.	.	5	.	.	5	.	3	.	4	.	17
Sumner (including Moa Bone Pt Cave dirt beds)	10	1	.	3	1	1	.	7	3	1	1	7	1	1	1	2	38
Pounawea	1	1	.	5	1	5	1	6	.	.	7	.	.	.	1	.	28
Wairau Bar Midden (Duff 1956)	38	.	.	.	.	7	.	23	4	0	32	.	17	6	2	3	132
Heaphy	15	3	3	.	.	1	.	3	.	14	4	.	.	.	.	.	43
Wairau Bar total	65	6	6	94	5	7	2	46	9	.	80	4	8	10	1	8	351

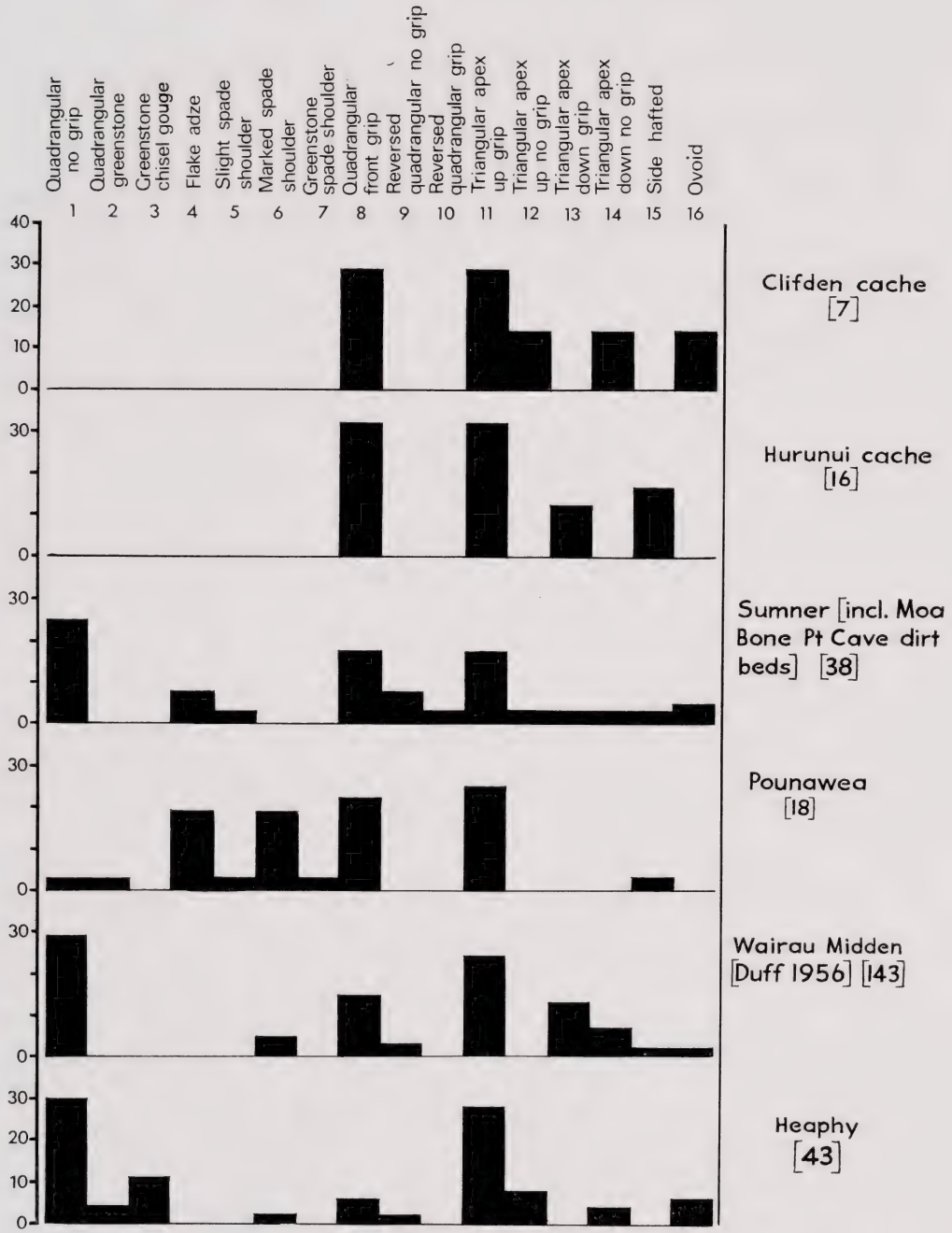


Fig. 29. Percentage distribution of adze forms. Part 1. Dominants triangular apex up to quadrangular front grip.

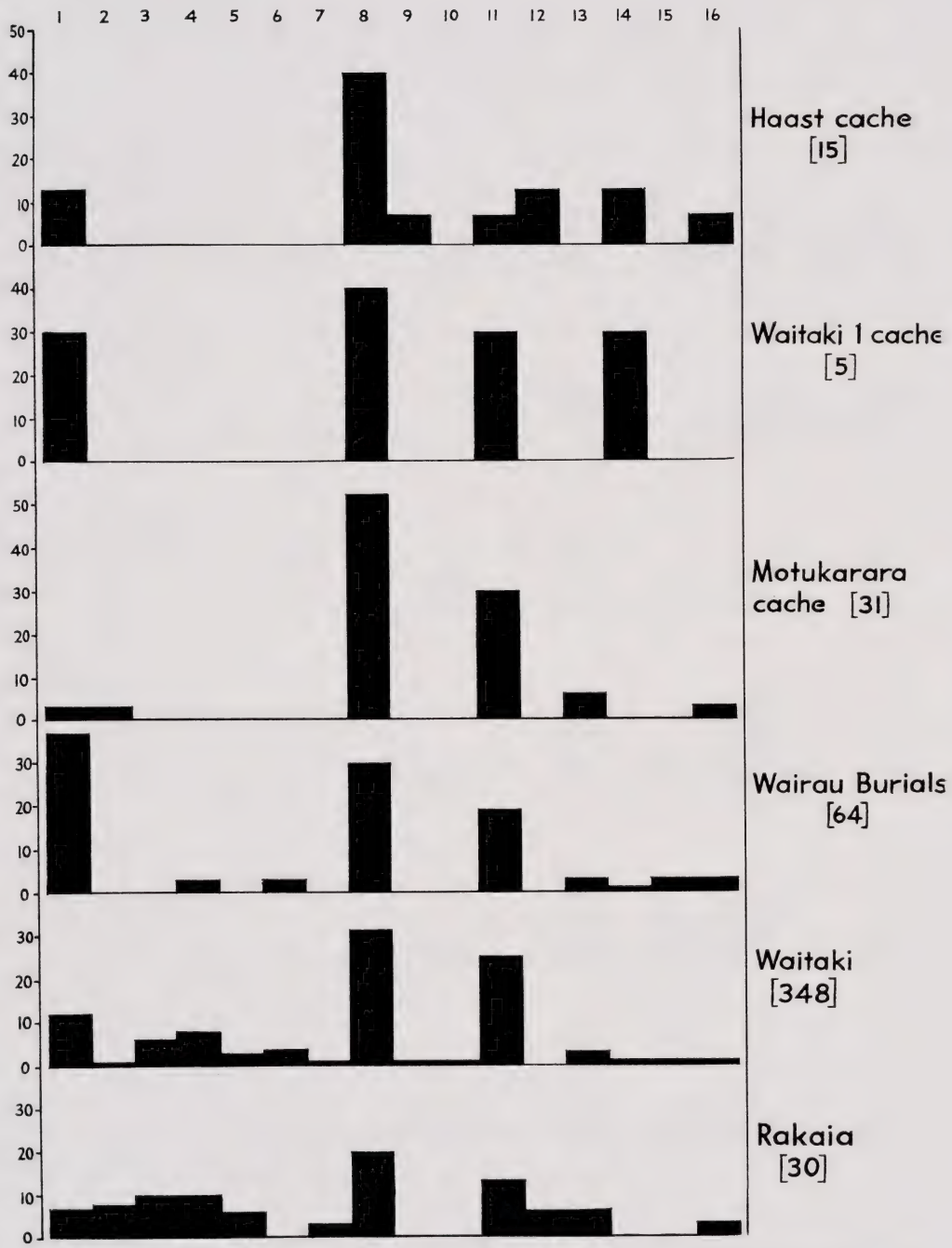


Fig. 30. Percentage distribution of adze forms. Part 2. Dominant quadrangular front grip.

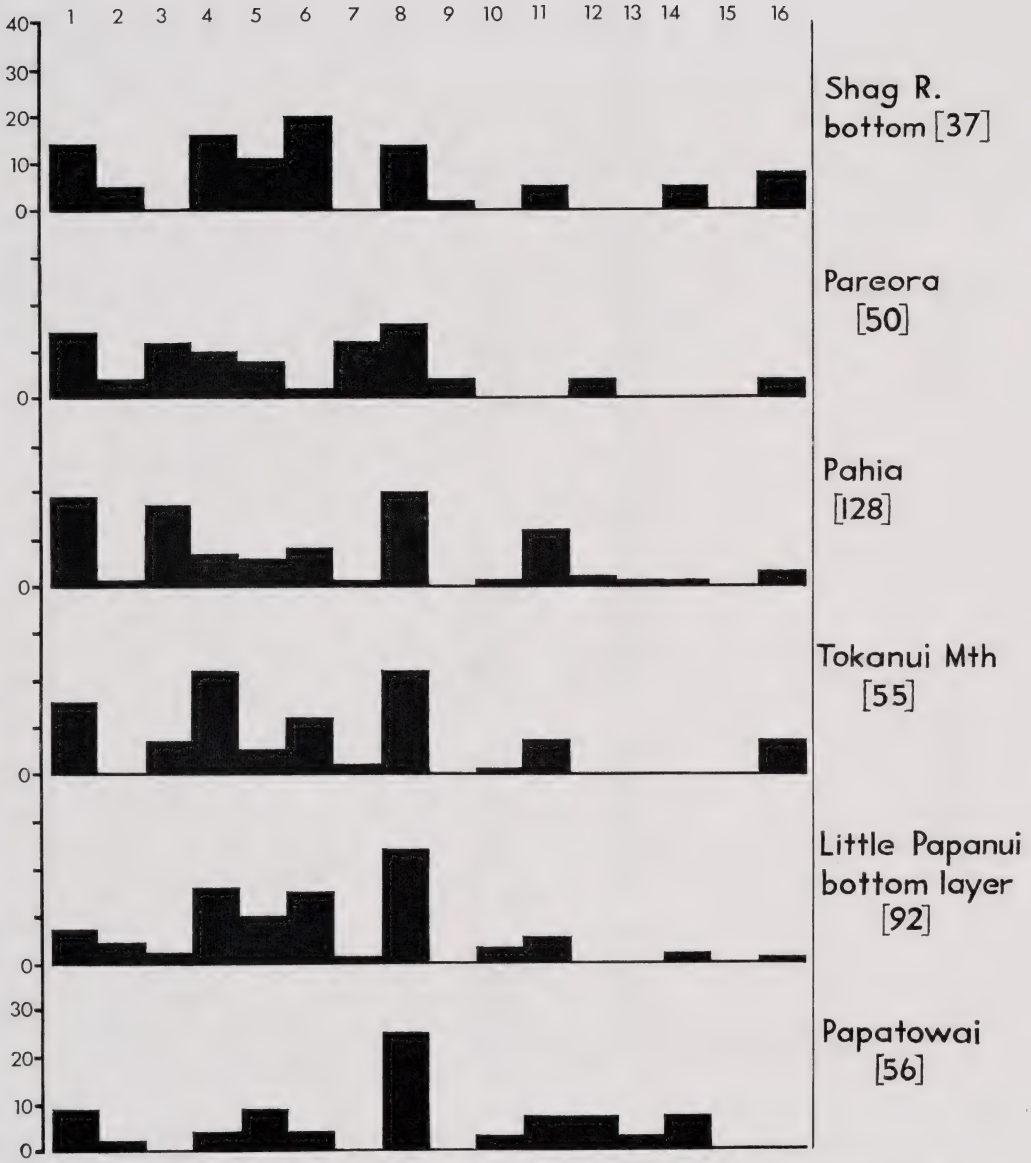


Fig. 31. Percentage distribution of adze forms. Part 3. Dominant quadrangular front grip to marked spade.

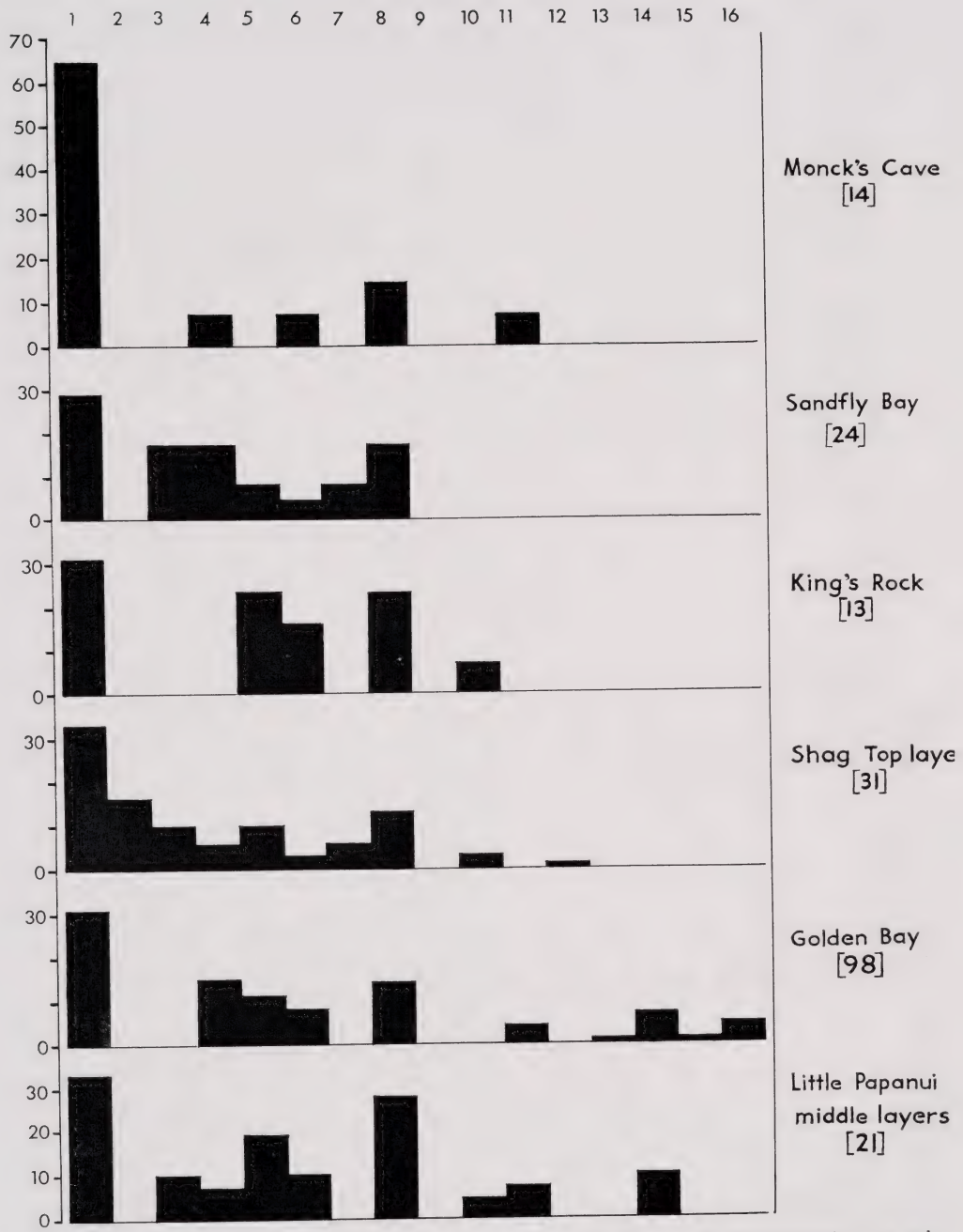


Fig. 32. Percentage distribution of adze forms. Part 4. Dominant quadrangular no grip in ordinary stone.

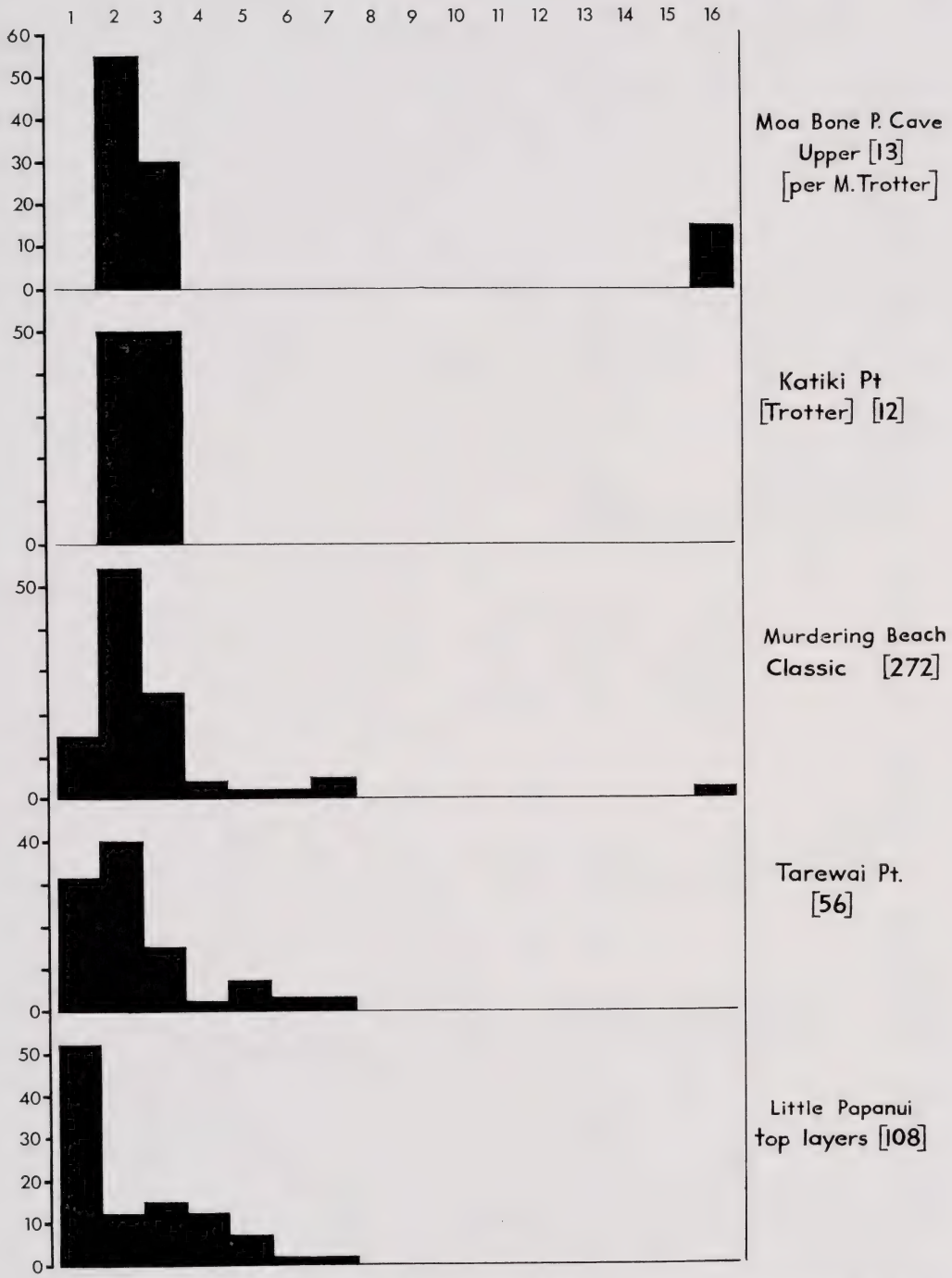


Fig. 33. Percentage distribution of adze forms. Part 5. Dominant quadrangular no grip in nephrite.

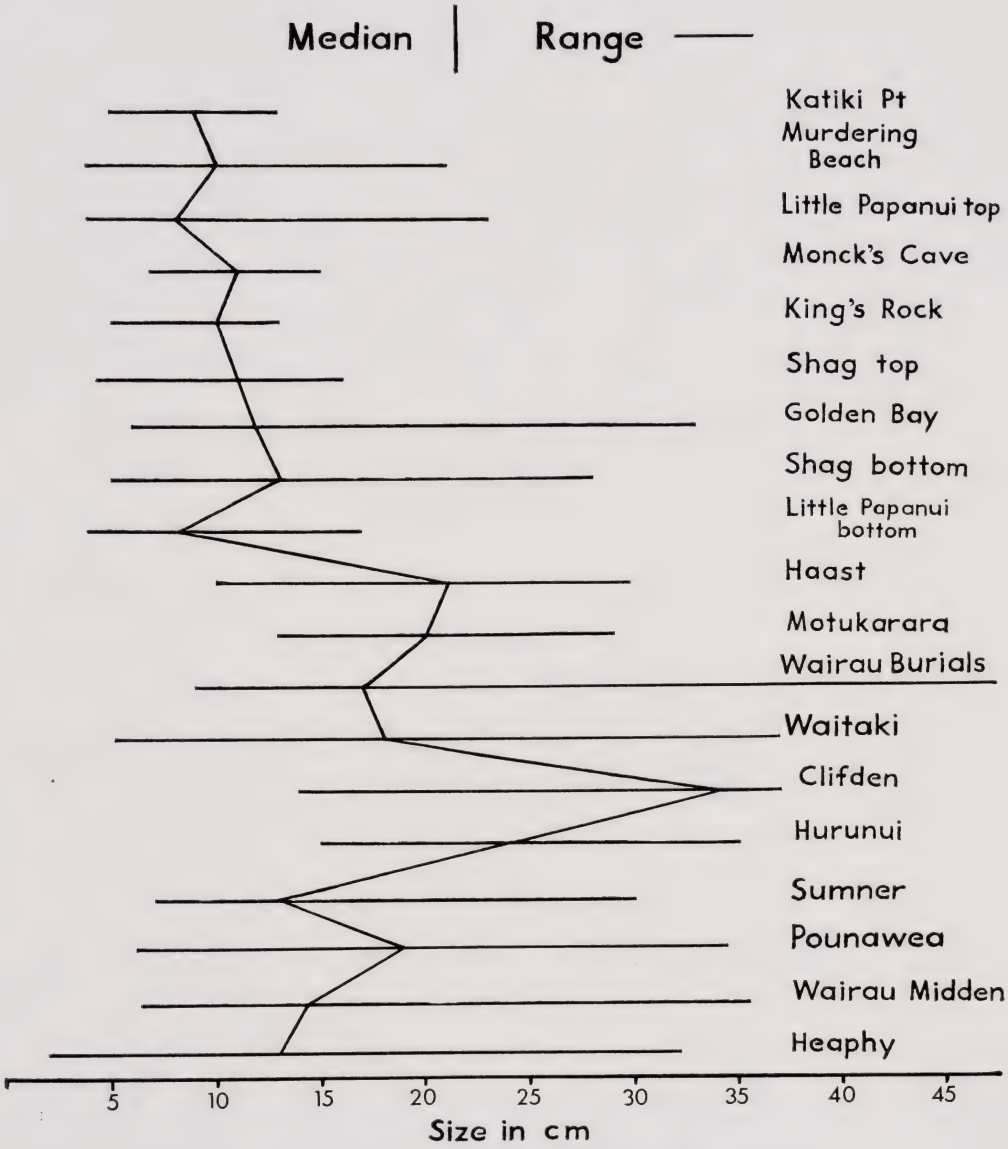


Fig. 34. Median and length range of total adze assemblages.

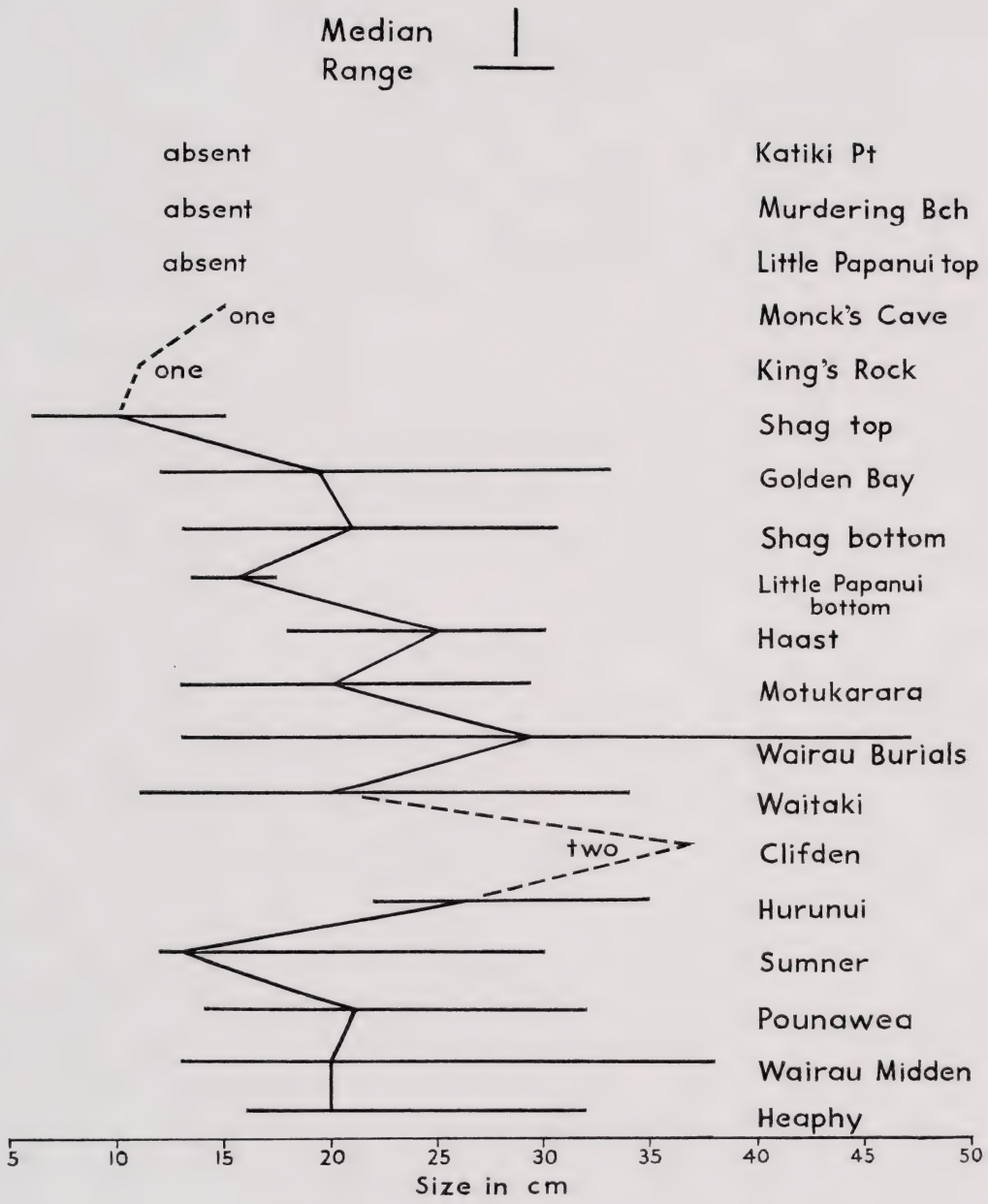


Fig. 35. Median and length range of quadrangular front grip adzes.

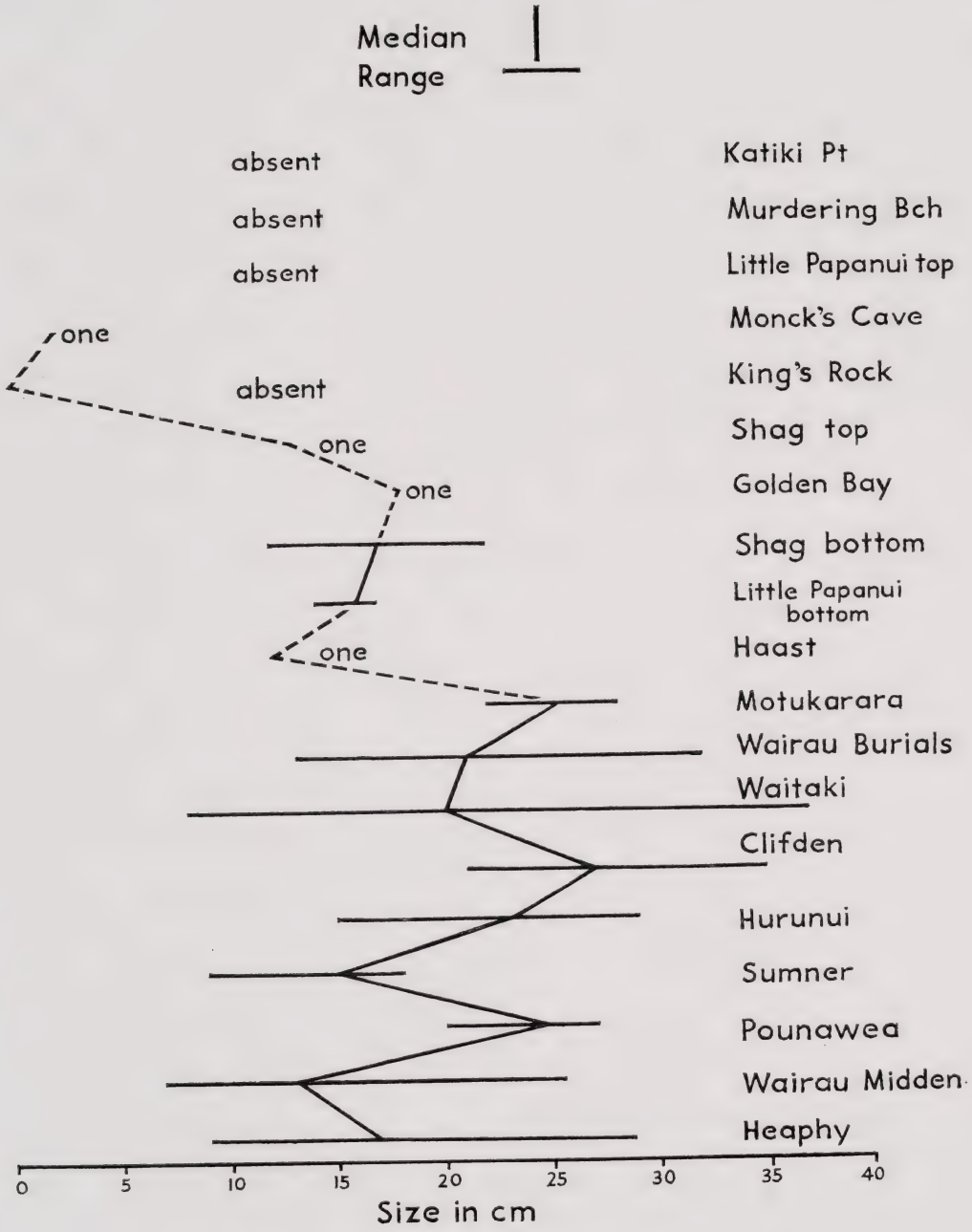


Fig. 36. Median and length range of triangular apex up grip adzes.

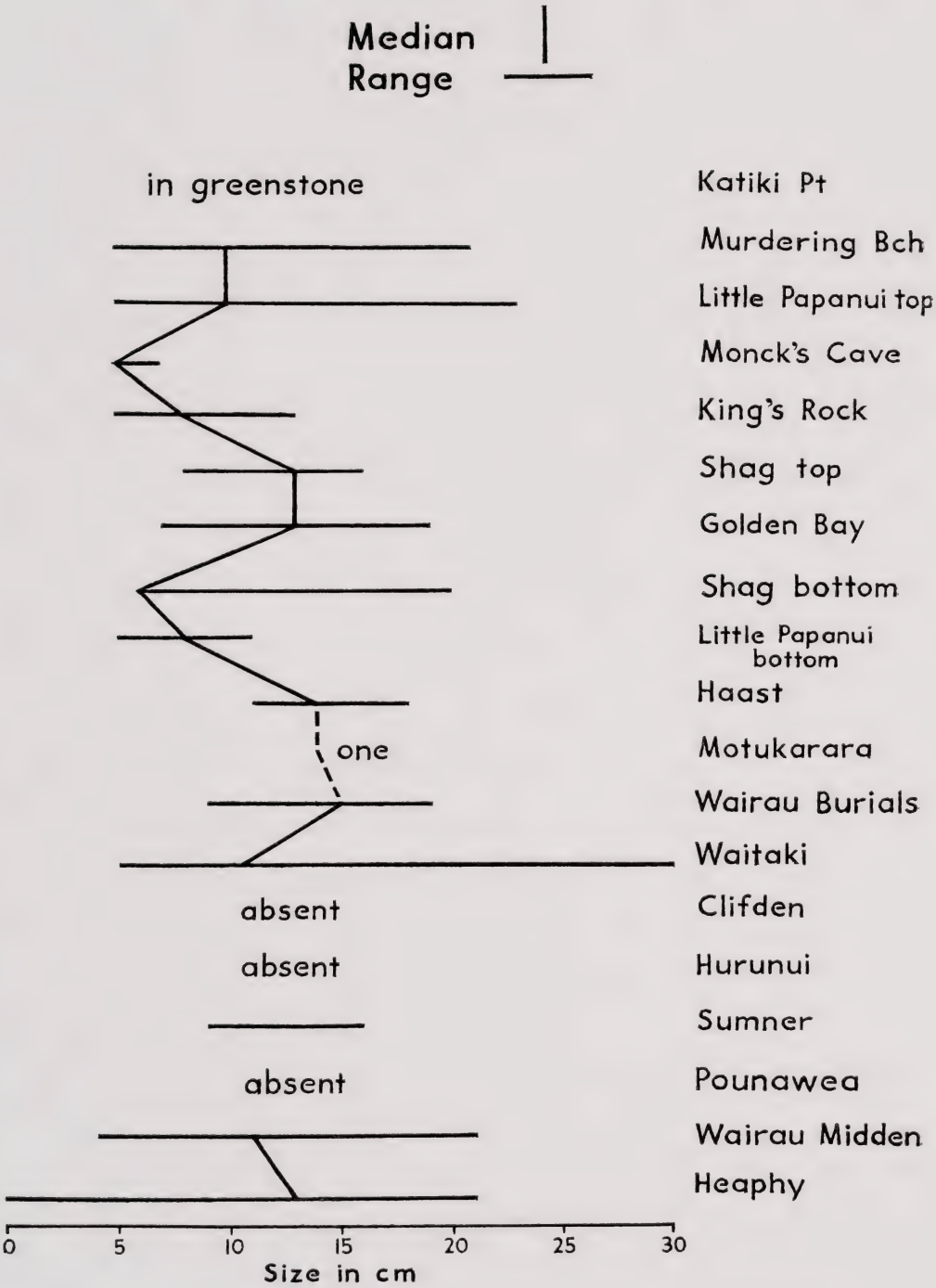


Fig. 37. Median and length range of quadrangular no grip adzes (not nephrite).

The percentage distribution and size range data would suggest that the variations in the triangular and quadrangular gripped forms correspond with the formative, maturity, decline and death in the life of an artifact group (Clarke 1968, p. 275). It is noted that the stages begin with the formative stage and that the birth of the artifact class is not represented in these graphs. The initial stages of this series of adze groups must be sought outside the South Island. By contrast the quadrangular ungripped group, has its birth in the lower section of the graph but does not proceed through its mature stage into a decline. Rather the item is replaced by one of European origin. On this evidence the collections represented here could be placed in their major groups according to the dominant adze groups (Table 4). In a New Zealand-wide study South Island adzes would start at Group 2, with Group 1 belonging to the "birth" stage.

It is worth noting here that the analysis indicates that at Wairau Bar the Burial layer could be much later than the Midden layer. Presumably this is true because here we are dealing with two excavated assemblages. A closer look at the Burial adzes, as recorded by Duff (1956), indicates that the burials do not all belong together, if the criterion of length range is valid. An attempt to resolve this problem is given in Fig. 38 showing the size range of adzes associated with the burials, as recorded by Duff (1956), checked against the recorded associations. The differentiation in associated artifacts and in length range strongly indicates that the burials do not belong strictly to one status group or perhaps even to one time period. The effect of mingling of various periods is to suppress the dominants and this is shown in the recording of the total number of adzes from Wairau Bar as in the bottom lines of Tables 2 and 3. I would suggest, however, that the position of the Burial and Midden adzes (Table 4), with the Burial adzes later, is a true one for the majority of the burials.

Flake Tools

Flake industries in the South Island belong to two main traditions, the 'awl' and the 'blade' industries. The awl industry of the Southern Cook Strait region (Figs. 39-42) and the equivalent awl industry of Foveaux Strait (Figs. 43, 44) are based on the occurrence of argillite in each area. F. V. Knapp described many of the Southern Cook Strait forms in 1924, 1928 and 1941. These industries have not been included in this paper as they will be the subject of a future paper.

The other tradition can be called the blade industry, which utilized ortho-quartzite or silcrete. This industry is distinguished as having a "technical sophistication" not found in the North Island (Shawcross 1964, p. 23). The typical tool is a parallel sided or leaf-shaped blade as described by Skinner & Teviotdale in 1927 for Shag River (Figs. 45-48). This industry is centred on Otago, but occurs as far south as Pahia. South from the South Otago sites, the blade industry is intermingled with elements of the Foveaux Strait awl industry, which gradually dominate the flake assemblages the further south the sites are. In South Otago the blades are made from mudstone and opal jasperoids as well as silcrete.

Blades are well represented in the Canterbury area but become less common in silcrete in the sites nearer Marlborough. In the Wairau Bar site there are only five silcrete blades, the rest being in chert. This attenuation of the industry in silcrete, in one sense, represents distance from the known quarry areas in Central Otago and South Canterbury. There is no known source of silcrete in the northern area. The awl tradition of S. Cook Strait appears in the Sounds. The intermingling phenomenon noted for South Otago does not appear to be evident.

Table 4. Grouping of sites containing adzes.

	Southland	South Otago	Otago	North Otago	Canterbury	Marlborough	Nelson	West Coast
Group 4			Murdering Beach Tarewai Pt Little Papanui top	Katiki	Moa Bone Pt Cave, upper Monck's Cave			
Group 3	Orepuke	King's Rock	Sandfly Bay Little Papanui mid	Shag River top	(Monck's Cave)		Golden Bay	
Group 2	Pahia Tokanui Mouth	Papatowai	Little Papanui bottom	Shag River bottom Waitaki River 1 Waitaki River	Pareora River Motukarara Rakaia River	Wairau Bar Burials		Haast
Group 1	Clifden	Pounawea			Hurunui Sumner	Wairau Bar Midden		Heaphy

( ) Alternative placement

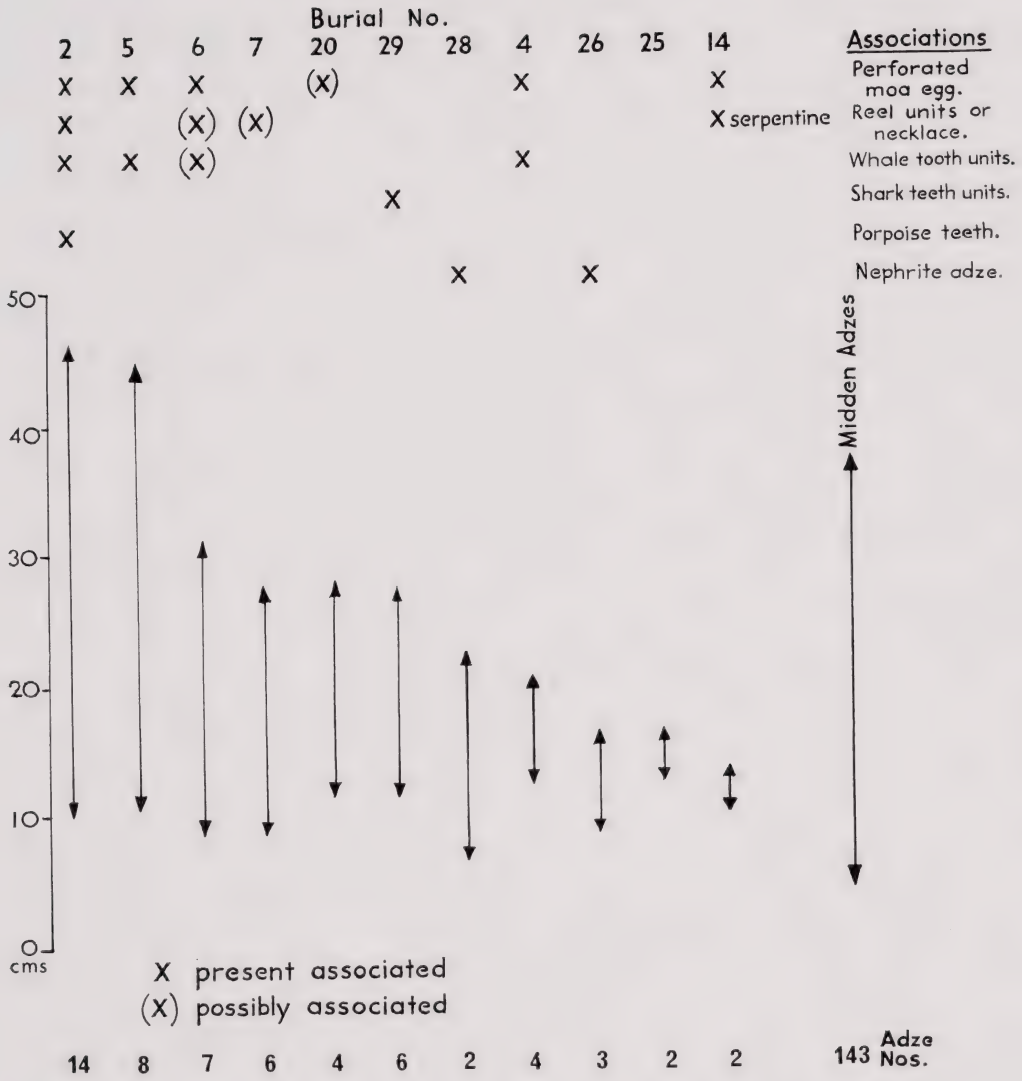
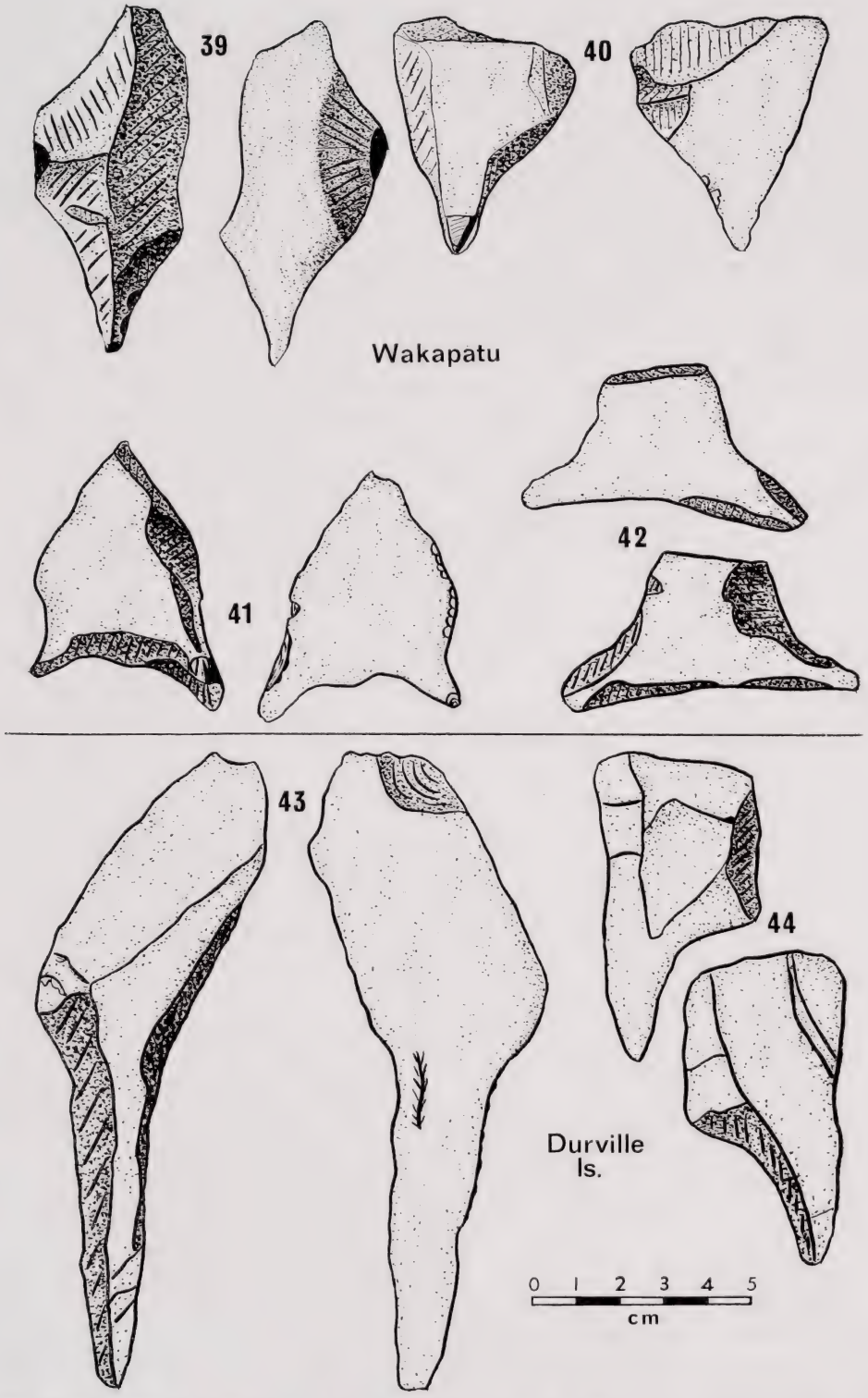


Fig. 38. Length range of adzes associated with Burials, Wairau Bar (Duff 1956).

In the blade industry secondary retouch can be from one or both sides, or one side of the blade may be left thick to produce a "backed blade" (Skinner & Teviotdale 1927). It was found in the preliminary analysis that secondary forms were local in time and space and were often confined to one layer or a site while the parallel sided blades as defined here were not. A selection was made of those basic forms which had chronological significance based on the technological expertise required to produce them. In terms of this, the classes or forms are as follows.



Figs. 39-44. Typical 'awl' flake tools. 39-42. Foveaux St. (Wakapatu). 43-44. Southern Cook St. (Durville I).

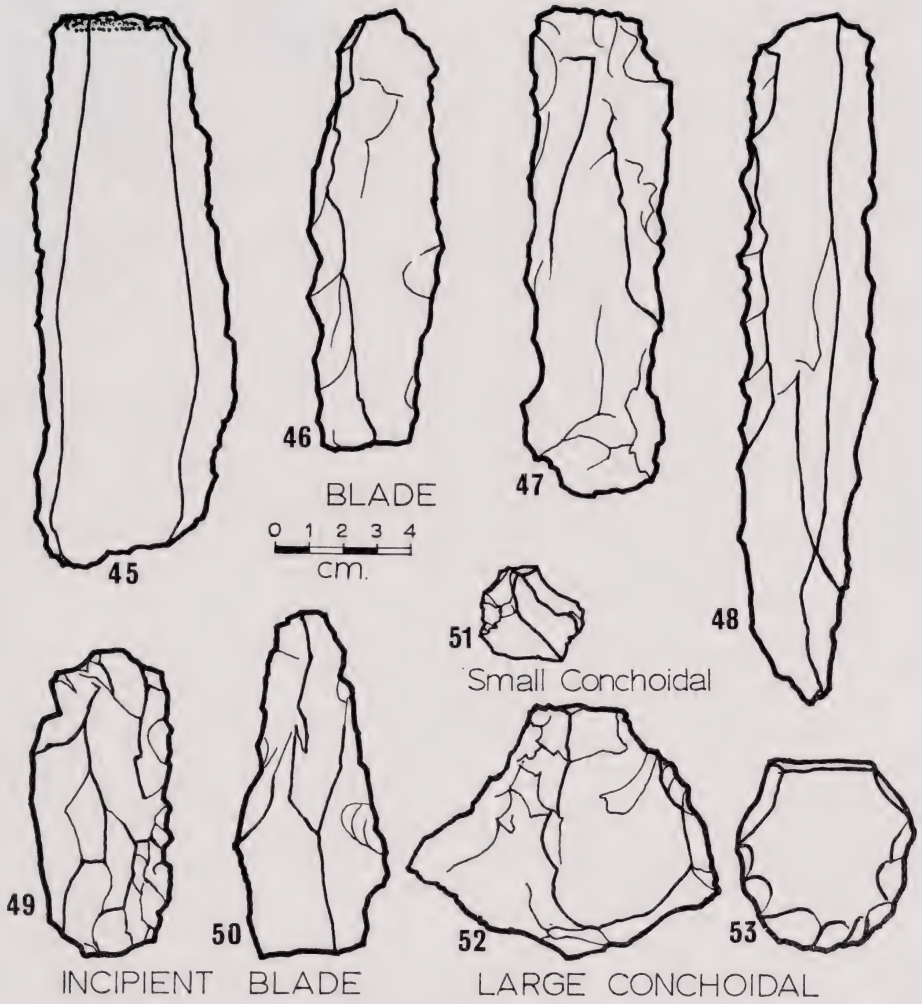
1. Blade (Figs. 45-48)
   (a) Parallel sided or leaf shaped with length 2½ plus times width across the bulb of percussion.
   (b) Struck off a prepared hammer dressed or finely flaked striking platform which is at 60° to 90° to the angle of the blow.
   (c) Struck off the core with a single blow and not reshaped after the original blow. Thin in proportion to length.
   (d) Modified with edge retouch on one or two sides, usually on two sides.
   (e) Retouched from one direction to produce biased edge or two directions to produce saw edge.

2. Incipient blade (Figs. 49, 50)
   (a) Irregular in shape but approximately the leaf shape with length about twice width across bulb of percussion (width).
   (b) Struck off a roughly flaked platform placed 45° to 90° to angle of blow. On some examples the platform is at a negative angle to the blow.
   (c) Struck off the core then thickness reduced with subsequent blows but blade still thick in proportion to length.
   (d) Modified with edge retouch on one or two sides.
   (e) Retouch from one or occasionally two directions.

3. Large conchoidal or chopper (Figs. 52, 53)
   (a) Shaped like a scallop shell, measuring more than 5cm wide at the bulb of percussion.
   (b) Struck off a roughly flaked platform 45° to 90° to the angle of strike.
   (c) Struck off core with single blow. Thick in proportion to total length.
   (d) Modified with edge retouch usually on central third of curve but may include whole curved surface.
   (e) Retouched from one direction.
   (f) Butt (or striking platform) area may be modified by flaking to make hand gripping more comfortable or to produce surfaces to take a lashing if lashed longitudinally on a stick handle.

4. Small conchoidal flake (Fig. 51)
   (a) A small shell-shaped instrument or somewhat irregularly shaped conchoidal fracture measuring less than 5cm across the flake at the bulb of percussion.
   (b) Struck off a platform prepared by fine flaking, hammer dressing or previous flake scar, with a single blow.
   (c) Edge retouch applied if thickness too great to give a good cutting edge. Otherwise retouch seems to be mainly the product of use.

5. Miscellaneous flake or waste flake
   (a) Irregular shaped waste flakes.
   (b) May be modified by edge retouch in some cases for use.
   (c) No regular striking platform.



Figs. 45-53. Typical 'blade' flake tools of Otago (Little Papanui bottom layer).

RESULTS OF ANALYSIS

Tables 5 and 6 show the percentage and numerical distributions of these forms in the sites.

Preliminary analysis of sample collections from two early and two late sites suggested that the length range of flakes taken overall was important. Figure 54 illustrates this point from the two early sites of Waitaki River and Shag River, and the two late sites of Little Papanui (top layers) and Murdering Beach (classic). This indicated that there was a chronological differentiation in the flake material from the two sets of sites as the graph has a clear bimodular shape with Waitaki and Shag peaking at about the 10cm length, while Little Papanui and Murdering Beach peak at 4cm. These sample collections were a random selection with no differentiation into forms or classes. Table 7 takes the same two sets of sites using different random samples. Length is

rendered in groups plotted against percentage distribution within the sizes. Again, the distribution is quite distinct. This analysis was undertaken to determine the significance of the numbers of broken pieces. Shawcross has suggested (Shawcross 1964, p. 21) that flake blades were blanks which were then snapped into sections. If this were so then the proportion of complete to broken blades should reflect this position with complete flake blades being much less common in proportion to the total of broken blades. As will be seen from Table 7, in the Waitaki and Shag River sites where blades are present in great numbers, the proportion of complete to broken flakes in each case mirrors the complete distribution. Breaking of flakes is a reflection of length, not of deliberate policy.

Table 5. Percentage distribution of flake tools.

	Blades	Incipient blades	Large conchoidal	Small conchoidal	Waste	Total numbers	Median blade size (cm)	Remarks on collection
Katiki Pt	5	.	13	60	24	45	5	Excavated (Trotter)
Long Beach	5	.	.	95	.	250	4	Top layer site
Murdering Beach Classic	12	.	.	74	14	100	4	
Kaikai's Beach, top layer	17	.	.	74	9	400	5	Lewis Collection attributed to top
Little Papanui, top layer	16	10	.	58	16	250	4	All that can be attributed
Monck's Cave	40	27	2	21	10	52	6	Probably mixed
Little Papanui, middle layer	45	15	3	30	7	177	4	All that can be attributed
Bromley	4	.	.	74	7	130	5	Excavated
Kyeburn	28	4	28	20	20	30	6	Single site, Danzies Pass
Anderson's Bay	35	20	2	21	22	52	6	Excavated, some mixture
Tai Rua	42	5	4	33	16	100	7	Excavated, all layers
Matarae	74	20	.	.	6	40	8	Shelter, total collection
Moa Flat	40	20	3	11	26	35	6	On Clutha River
Onepoto	53	3	10	34	0	100	8	A little mixed, = Pipikaretu
King's Rock	50	8	.	20	22	24	9	All layers
Cannibal Bay	58	18	.	25	1	12	9	All layers, surface
Murdering Beach, Moa-hunter	22	18	10	28	22	45	12	Site on back dunes
Shag River, bottom layer	74	9	13	.	4	350	12	All that can be attributed
Nenthorn	30	25	12	4	29	24	12	Quarry
Rakaia River	21	16	6	23	34	118	11	Mixed layers
Kaikai's Beach, bottom layer	47	10	3	40	.	200	8	Identified by peat staining
Little Papanui, bottom layers	41	22	6	23	8	500	11	Excavated
Oturehua	25	25	3	16	31	78	11	Quarry site, top layer
Wairau Bar Midden	34	18	18	20	10	108	7	In chert
Pleasant River	30	8	3	19	40	170	11	Excavated but all layers
Pareora River	10	8	12	21	9	508	9	Probably selected
Pounawea	46	21	9	11	12	75	7	Mainly bottom two layers
Papatowai	34	25	14	13	14	160	8	All layers, mainly bottom
Waitaki River	32	20	14	24	10	778	7	? mixed layers
Sumner	30	23	5	35	0	48	6	? mixed layers
Gray's Hills	6	33	30	2	29	100	6	Probably selected

Table 6. Numerical distribution of flake tools.

	Blades	Incipient blades	Large conchoidal	Small conchoidal	Waste	Total numbers
Katiki Pt	2	0	5	28	10	45
Long Beach	13	0	0	237	0	250
Murdering Beach Classic	12	0	0	74	14	100
Kaikai's Beach, top layer	68	0	0	296	36	400
Little Papanui, top layer	40	25	0	145	40	250
Monck's Cave	20	14	1	11	6	52
Little Papanui, middle layer	80	26	5	53	13	177
Bromley	6	8	1	108	7	130
Kyeburn	8	1	8	6	7	30
Anderson's Bay	18	10	1	11	12	52
Tai Rua	42	5	4	33	16	100
Matarae	29	10	0	0	1	40
Moa Flat	19	7	1	4	4	35
Onepoto	53	3	10	34	0	100
King's Rock	12	2	0	5	5	24
Cannibal Bay	7	2	0	3	0	12
Murdering Beach, Moa-hunter	10	8	5	12	10	45
Shag River, bottom layer	259	31	45	0	15	350
Nenthorn	7	6	3	1	7	24
Rakaia River	25	19	9	27	38	118
Kaikai's Beach, bottom layer	94	20	6	80	0	200
Little Papanui, bottom layers	205	110	30	115	40	500
Oturehua	32	7	3	5	31	78
Wairau Bar, Midden	39	19	19	20	11	108
Pleasant River	51	13	6	32	68	170
Pareora River	47	241	66	104	50	508
Pounawea	35	16	7	8	9	75
Papatowai	54	39	22	21	24	160
Waitaki River	245	156	105	272	0	778
Sumner	18	11	2	17	0	48
Gray's Hills	6	33	30	2	29	100

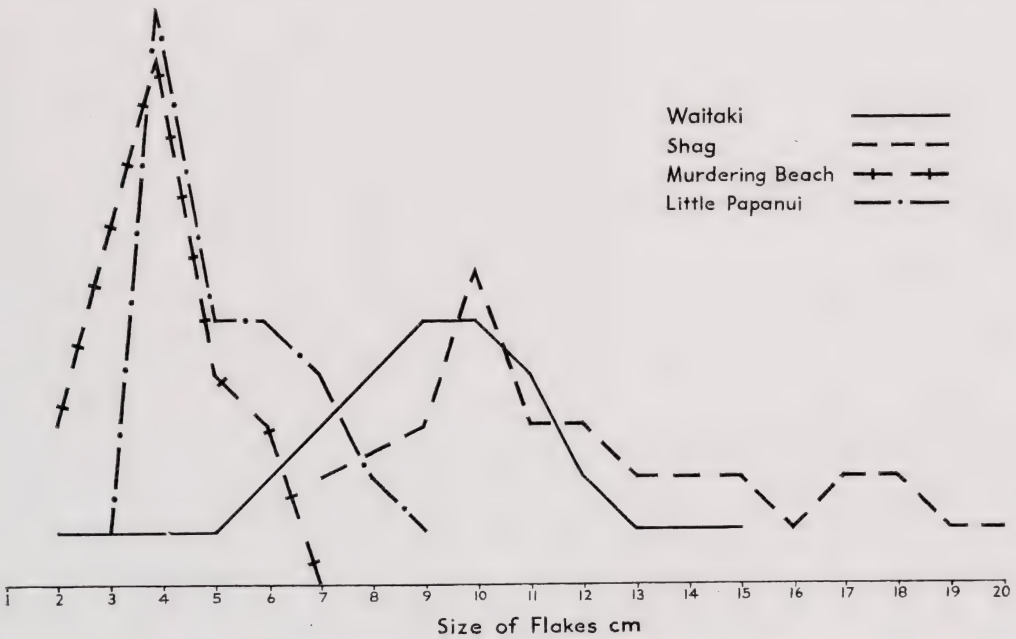


Fig. 54. Size distribution of typical sample collections of flake material.

Table 7. Length distribution and breakage of flake tools in four sites.

Site	Nos. of flake tools	Length range 1 - 5cm	6 - 10cm	11 - 15cm	16 - 20cm	Total Percentages
Murdering Beach	92	76% complete 19% broken	3% complete 2% broken			79 21 100
Little Papanui	487	72% complete 6% broken	20% complete 2% broken			92 8 100
Shag River	173	17% complete 6% broken	38% complete 11% broken	14% complete 5% broken	7% complete 2% broken	76 24 100
Waitaki River	256	20% complete 9% broken	53% complete 15% broken	2% complete 1% broken		75 25 100

In Figs. 55-57 and Tables 5 and 6 the sites are arranged in order according to the total profile displayed by the proportional distribution of the flake tool classes, e.g. in Fig. 55 classes 2 and 3 are well represented, in Fig. 56 class 1, leading to Fig. 57, where class 4 dominates. The significant chronological distinction is between total proportion of blades and of small conchoidal flake. In these terms, Fig. 58, which has been ordered as for Table 5, illustrates the complementary distribution pattern displayed by the percentage distribution of these two forms.

Blades as a group seem to follow the birth, maturity, death or Clarke's "threshold, formation, coherent, post-coherent, threshold" (Clarke 1968, p. 225) sequence. This is evident in the graphs and is also very clearly demonstrated in Fig. 59, which records length range of complete blades in the sites arranged in the same order as in Table 5. There are anomalies, but in general the length range reflects the life of this form especially when arranged, as here, according to the percentage distribution of the form. All the sites at the beginning of the graph have less than 50% blades (usually 30-40%). Sites in the middle of the graph where the size is greatest have up to 75% blades. Sites in the declining group generally have less than 50% blades, while the last group have less than 40% blades.

A further criterion which can be employed is technical expertise. Sites in the first group have less well-made blades than those in the second, third or fourth. This criterion, if employed, actually removes most of the anomalies in the present series.

A computer programme in which all variables can be analysed is an ideal solution. B. F. Leach, in an important study (Leach 1969) has been able to use such a programme for four major sites — Karitane A, Riverton, Wakapatu and Oturehua. Similarity was closest between Oturehua and Riverton. Oturehua is a silcrete quarry and working floor dated to A.D. 1023 $\pm$ 82 and 1053 $\pm$ 27 (Leach 1969, p. 72). Riverton is an exploitation site of a locally occurring green argillite and has intense industrial activity in adze-making. The sample used in Leach's study was in direct association with charcoal, which gave a date of A.D. 1402 $\pm$ 39 (1969, p. 66). Closest to these two was Wakapatu, a midden site with argillite flakes of awl type and adze pieces dated to *c.* A.D. 1270. A smaller assemblage from Pleasant River shared features with Oturehua and Karitane, the latter a classic Maori site of *c.* A.D. 1800.

It has been argued in an earlier paper (Simmons 1967) that if the blade industry of Murihiku developed in New Zealand then it could have been derived from common Polynesian adze-making techniques. To take this a stage further, any culture group with the knowledge of flaking as an adze-making technique such as Polynesia was able to produce flake tools as required or to use adze waste flakes if needed for this purpose. The deliberate production of long parallel blades, as in the quartzite blades of Otago and the chert or obsidian blades of the Solomons (Auckland Museum), the argillite awls of Cook Strait, Foveaux Strait and the basalt awls and occasional blades of Pitcairn, required a slight, but not very marked, technological change. The similarity of these various industries does not necessarily imply direct contact but it may do so. The closeness of Riverton, an adze manufactory, and Oturehua, an early silcrete blade quarry, suggests that the two technologies are not all that far apart.

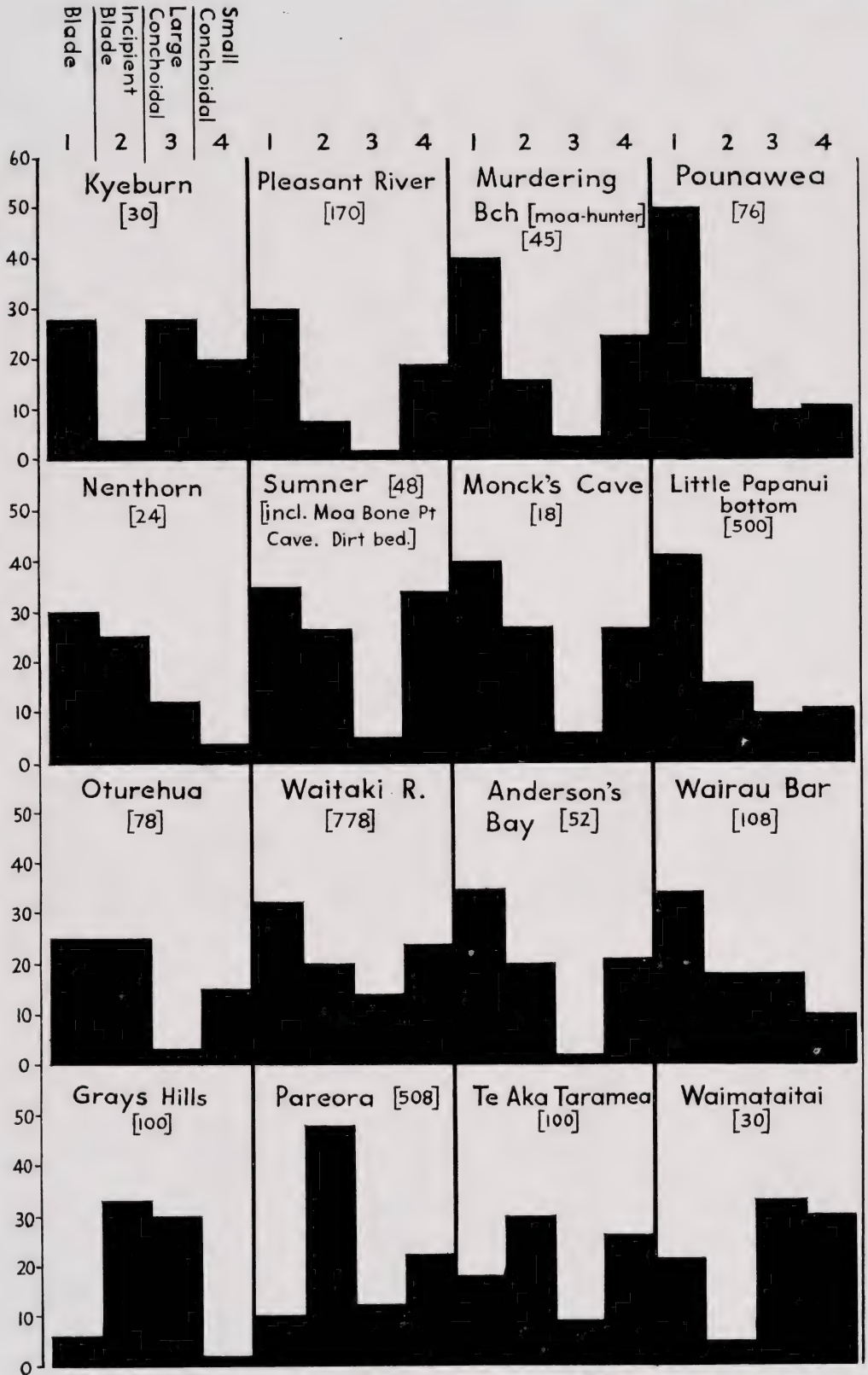


Fig. 55. Percentage distribution of flake tool classes. Part 1. From Class 2 and 3 dominant to Class 1 dominant.

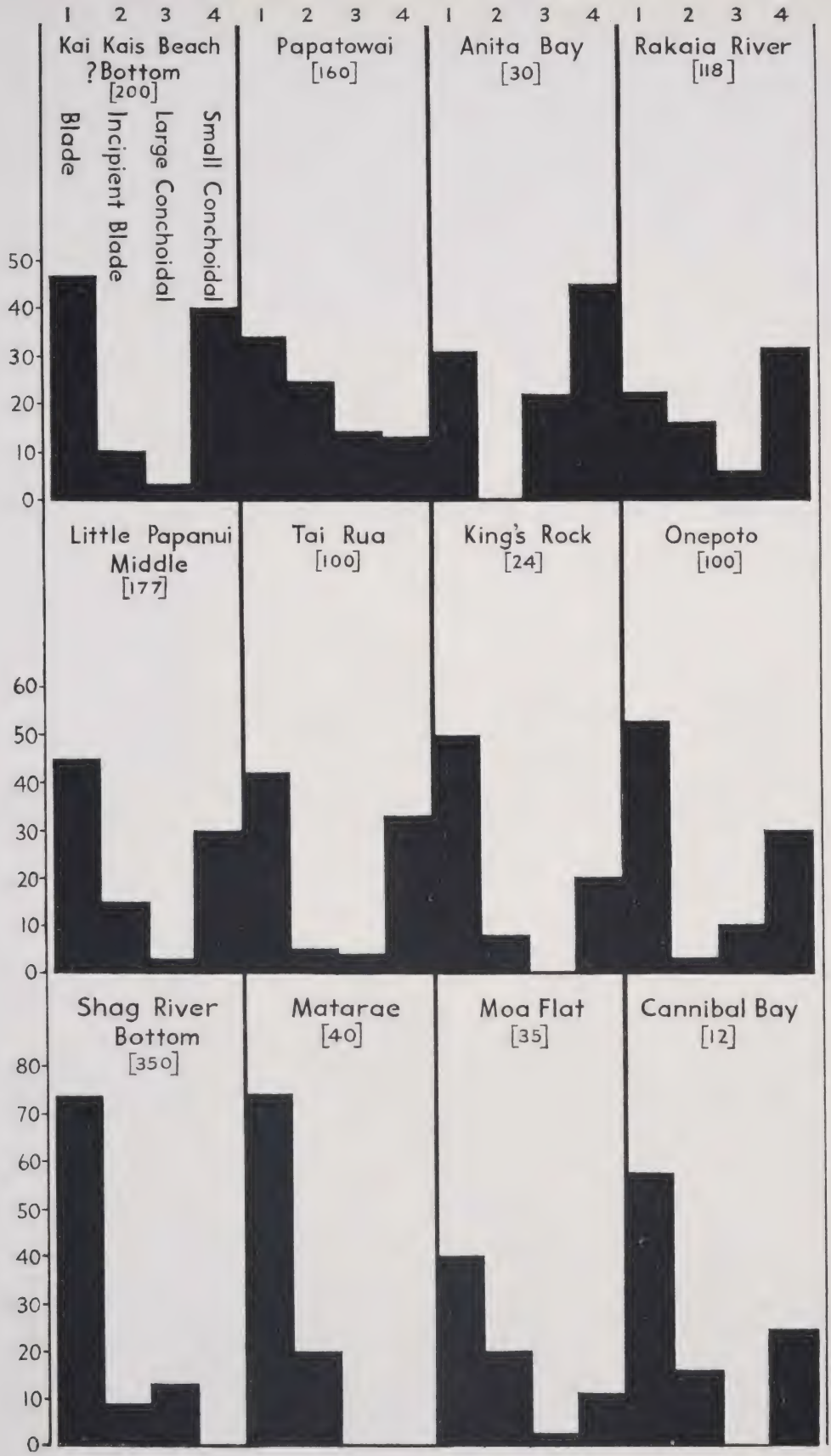


Fig. 56. Percentage distribution of flake tool classes. Part 2. From Class 1 dominant to Class 4 dominant.

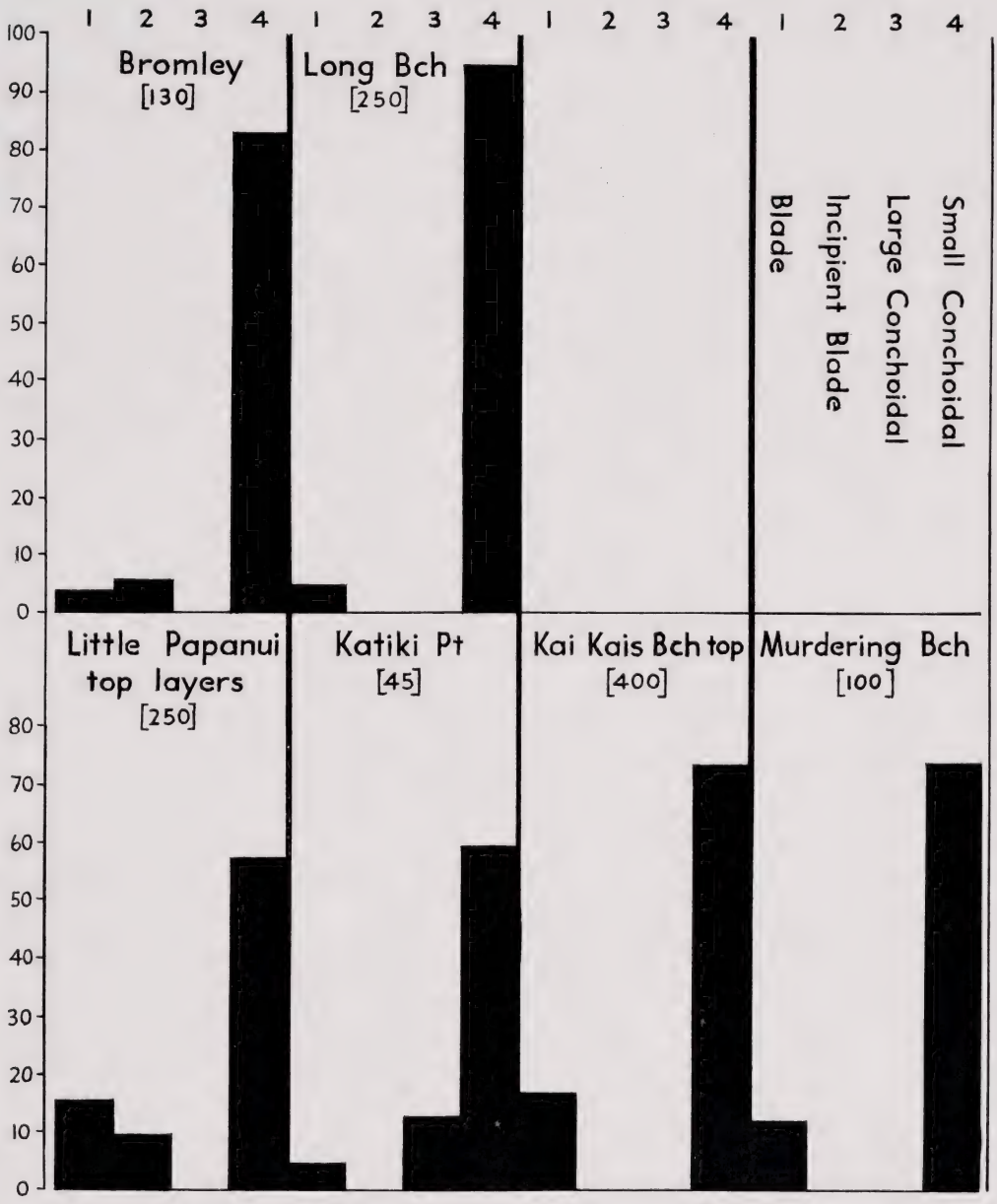


Fig. 57. Percentage distribution of flake tool classes. Part 3. Class 4 dominant.

Leach suggested that Murihiku culture history is a continuous one from earliest to latest with the greatest period of technological change in the 14th century. ". . . the initial settlement was followed by an accelerating rate of technological change, reaching its peak in the 14th century and resulting in the decline rather than the development of this specialised industry in Murihiku." (Leach 1969, p. 138). The flake technology of the Classic Maori sites in Murihiku is a continuation of the flake industry of the earlier periods, indicating a cultural absorption.

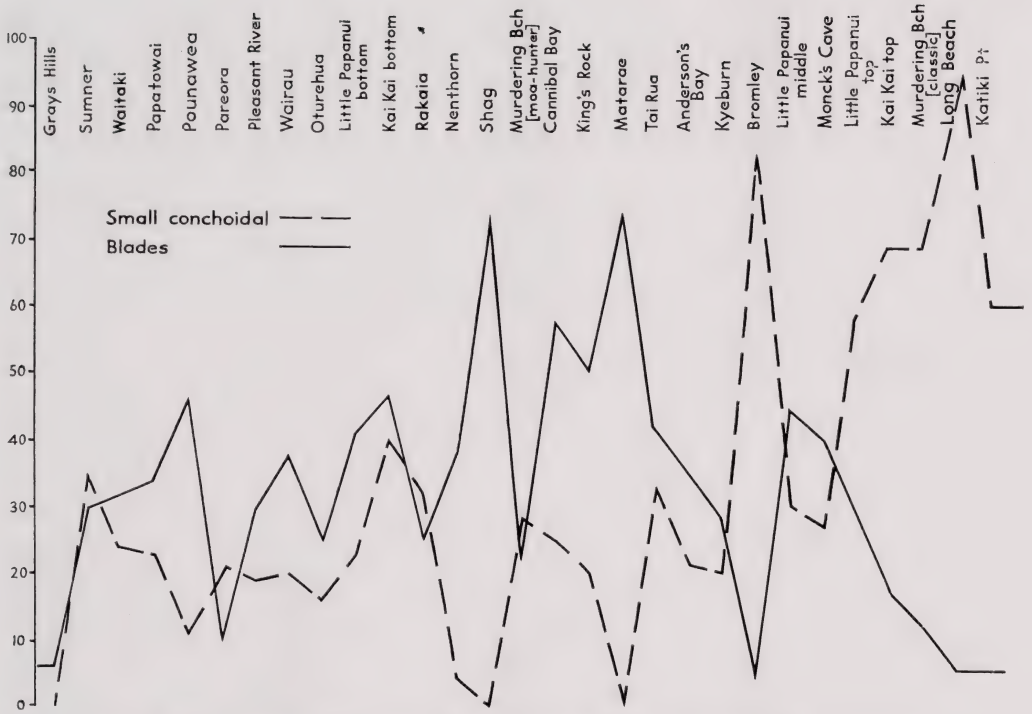


Fig. 58. Percentage distribution of blades and small conchoidal flake compared.

Figures 55-58, Table 5, and Fig. 59, suggest that the sites containing flake tools can be grouped. Whether the relationship of one site to another is simple or complex, or whether the network of relationship is in three dimensional form, or not, cannot really be determined in a fairly simple study of this kind. All that can be stated is that sites appear to stand in certain relationships to each other, the exact definition of which must await further study.

Groupings for length range (Group 1, length up to 17cm long; Group 2, length up to 26cm; Group 3, up to 16cm; Group 4, up to 7cm) and for percentage distribution are given in Tables 8 and 9.

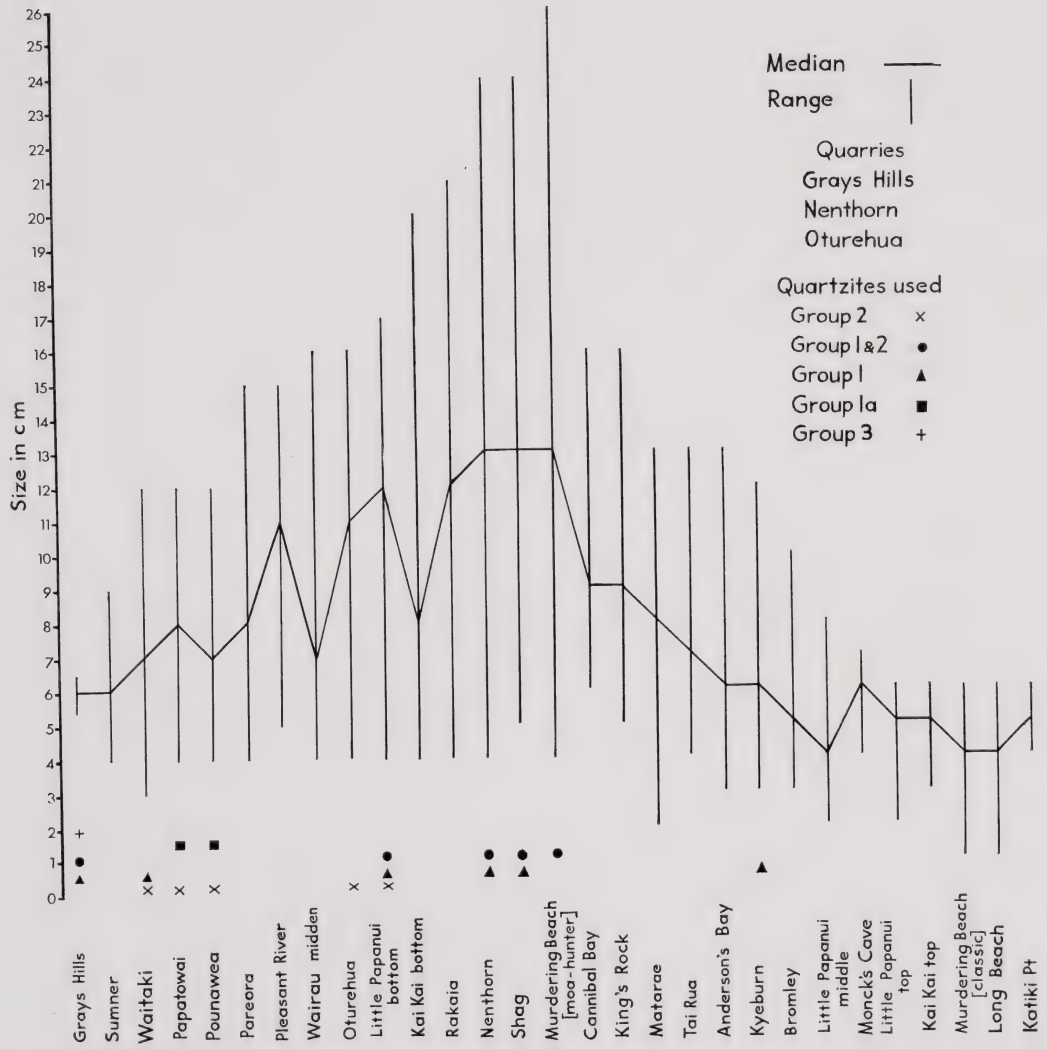


Fig. 59. Length range and median of *complete* flake blades.

Table 8. Grouping of sites by area and length range of flake tools.

	Southland	South Otago	Otago	North Otago	Canterbury	Marlborough
Group 4*			(Karitane) Murdering Beach Kaikai's, top Little Papanui top	Katiki Pt Monck's Cave		
Group 3		King's Rock Cannibal Bay	Little Papanui mid Anderson's Bay Matarae	Kyeburn Tai Rua (Pleasant R)	Bromley	
Group 2	(Wakapatu)		Murdering Beach, Moa-hunter, b Kaikai's bottom	Shag R b, c Nenthorn, b, c	 Rakaia R	
Group 1	(Riverton)	Pounawea, a, d Papatowai, a, d	Little Papanui bottom, a, b, c	(Ototara) Oturehua, a Pleasant R Waitaki R a, c	Pareora R Sumner Gray's Hills, b, c	Wairau Bay Midden

* Group 4, —7cm; Group 3, —16cm; Group 2, —26cm; Group 1, —17cm
( ) Leach 1969 — basis for placement
a, b, c, d quartzite group used (Simmons & Wright 1967)

Table 9. Grouping of sites by area and percentage distribution of flake tools.

	Southland	South Otago	Otago	North Otago	Canterbury	Marlborough
Group 4			Long Beach Murdering Beach Kaikai's, top Katiki Pt Little Papanui top		Bromley	
Group 3		Papatowai King's Rock Cannibal Bay	Kaikai's, bottom Anita Bay Little Papanui mid Onepoto Matarae Moa Flat	Tai Rua Shag R	Rakaia R	
Group 2		Pounawea	Murdering Beach Little Papanui, bottom Anderson's Bay	Kyeburn Pleasant R Nenthorn Waitaki R Oturehua	Monck's Cave	Wairau Bar Midden
Group 1				Waimataitai	Te Aka Tarewa Pareora R Gray's Hills	

Here two sets of grouping show quite clearly the problems associated with museum, surface and mixed collections. Depending on which set of criteria are used, the apparent grouping of sites or collections changes. This is due to the mixing of layers which shows up in those graphs (Figs. 55-58) and the table (Table 9) orientated to percentage distribution. In the length range (Fig. 59), sites which are early have small blades and a less sophisticated technology for producing them. In the very late sites, blades are rare and small, produced by a superb technology.

In the sites of the periods between, the blades become sophisticated and increase markedly in size, then the blades decrease in size though the technology remains. The distinguishing characteristic separating the early and these later sites is not blade size but technology.

Secondary characteristics are the greater proportion of small conchoidal flake in the later sites and the almost complete absence of the other flake-tool classes.

With these criteria it is possible to overcome, to a certain extent, the effects of mixing in collections of flake material and to suggest that the various groups should be as in Table 10. The percentage distribution table (Table 9) and graphs (Figs. 55-58) also indicate that sites with mixed populations of flake material were occupied also at a later or earlier period than the main one and such alternative or complementary groupings are placed in parenthesis in Table 10.

Table 10. Grouping of sites by area and sequence of flake tools.

	South Otago	Otago	North Otago	Canterbury	Marlborough
Group 4		Karitane Murdering Beach Kaikai's Beach top Little Papanui top	Katiki	Monck's Cave Bromley	
Group 3	King's Rock Cannibal Bay (Papatowai) Moa Flat	Little Papanui middle Anderson's Bay Onepoto Matarae	Tai Rua Kyeburn (Shag R)	(Rakaia R)	
Group 2		Murdering Beach Moa-hunter Kaikai's Beach bottom Little Papanui bottom (Anderson's Bay)	Shag R Nenthorn Pleasant R (Waitaki R) (Oturehua)	Rakaia R (Monck's Cave) (Sumner)	(Wairau Bar)
Group 1	Pounawea Papatowai		Oturehua Waitaki R Waimataitai	Sumner Gray's Hills Pareora River	Wairau Bar

( ) alternative or complementary placement

Fishhooks

Fishhooks for the southern area of the South Island were studied in 1967 by Hjarno (Hjarno 1967) and in a later study in the same year (Simmons 1967). In this analysis the major groups of fishhooks only have been taken together to illustrate the evolutionary trends. These groups are as follows.

1. One-piece bait hooks of all forms including Hjarno types D1, D2, D3, D4.
2. Barbed composite bait hook points including simple points with outer barbs, reversed barbed points, serrated and multi-barbed points or Hjarno types C2, C3, C4, C5.

   These two groups are contrasted in Fig. 60.

4. Unbarbed composite bait hook points including small, long slender, and medium points of Hjarno type C1.
5. Lure hook points excluding barracouta hook points of Hjarno types B1, B2.

   These two groups are contained on Fig. 61.

6. Simple barracouta lure hook points of Hjarno Type 1 variety A.
7. Serrated and dog-leg barracouta lure hook points of Hjarno Type A varieties 2 and 3.

   These last two belong in the same period of time so are grouped to contrast with the simple form in Fig. 62.

Numerical distribution of these hooks has been published in detail in Hjarno's monograph (1967) and is not repeated here. Hjarno and Trotter (Trotter 1965b) have both clearly demonstrated the evolutionary trends expected in Otago fishhooks. In the present study only a few extra sites are included and additional hooks have been included without altering the tendencies already exhibited in the previous studies.

These are that:

1. One-piece bait hooks are common in early sites but are largely replaced by barbed points in late sites (Fig. 60).
2. Unbarbed points tend to become more common in the early to middle part of the range, then to become very uncommon. Lure hook points are commoner in the early part of the range (Fig. 61).
3. Simple barracouta points occur almost exclusively in the early part of the range but are accompanied by the two intrusive forms of dog-leg and serrated points in the later part of the range. The dog-leg and serrated points are also found in Hawkes Bay (Fig. 62).

There are various exceptions to these tendencies, but many would seem to reflect the effects of mixed provenance of a surface collection rather than true exceptions. However, the archaeological sites of North Otago suggest that regional variations will be of great importance in future studies. The sequence which emerges from the study of fishhooks in order is tabulated (Table 11) with the sites grouped in terms of the dominance of the various forms.

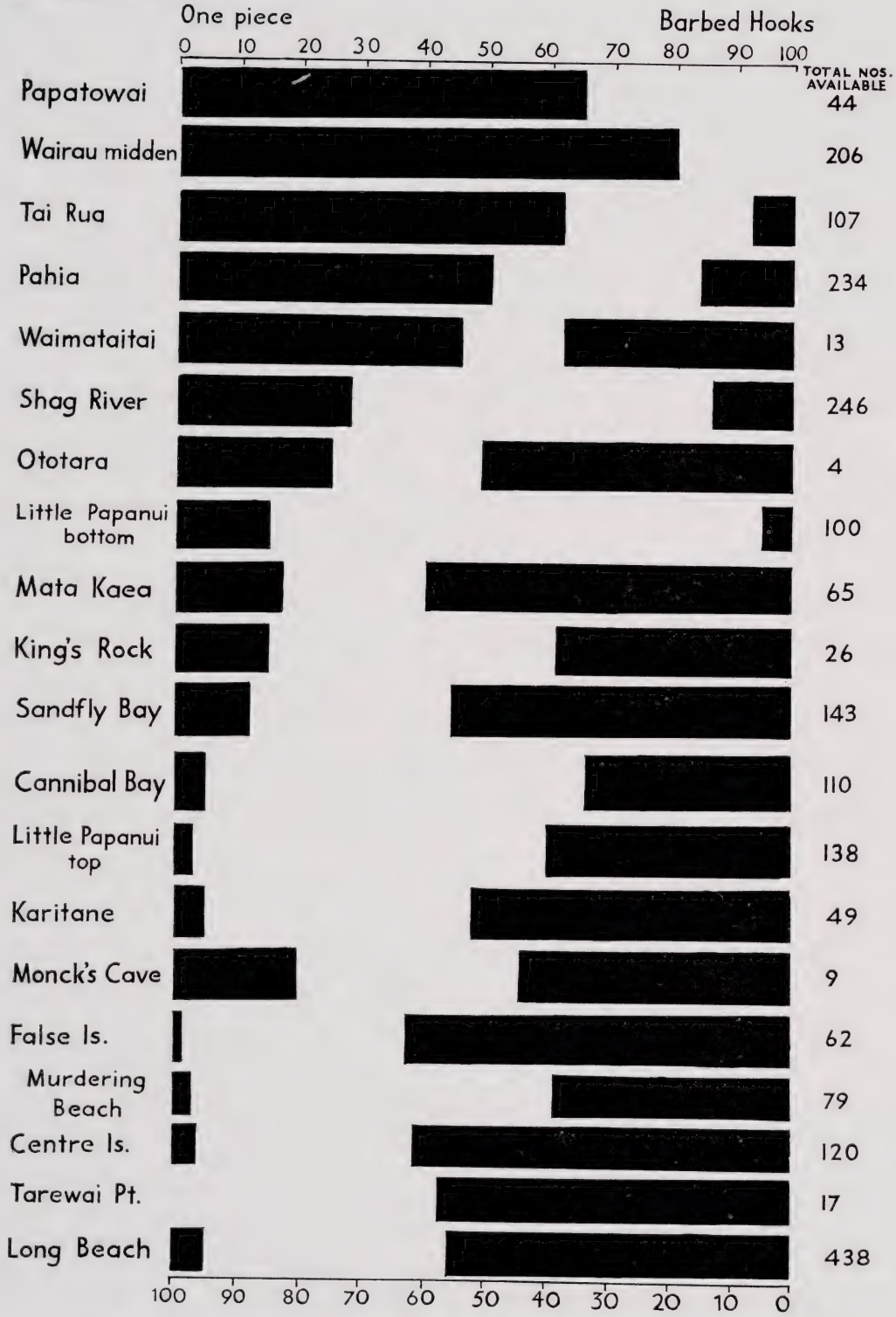


Fig. 60. Percentage distribution of one piece hooks and barbed hook points.

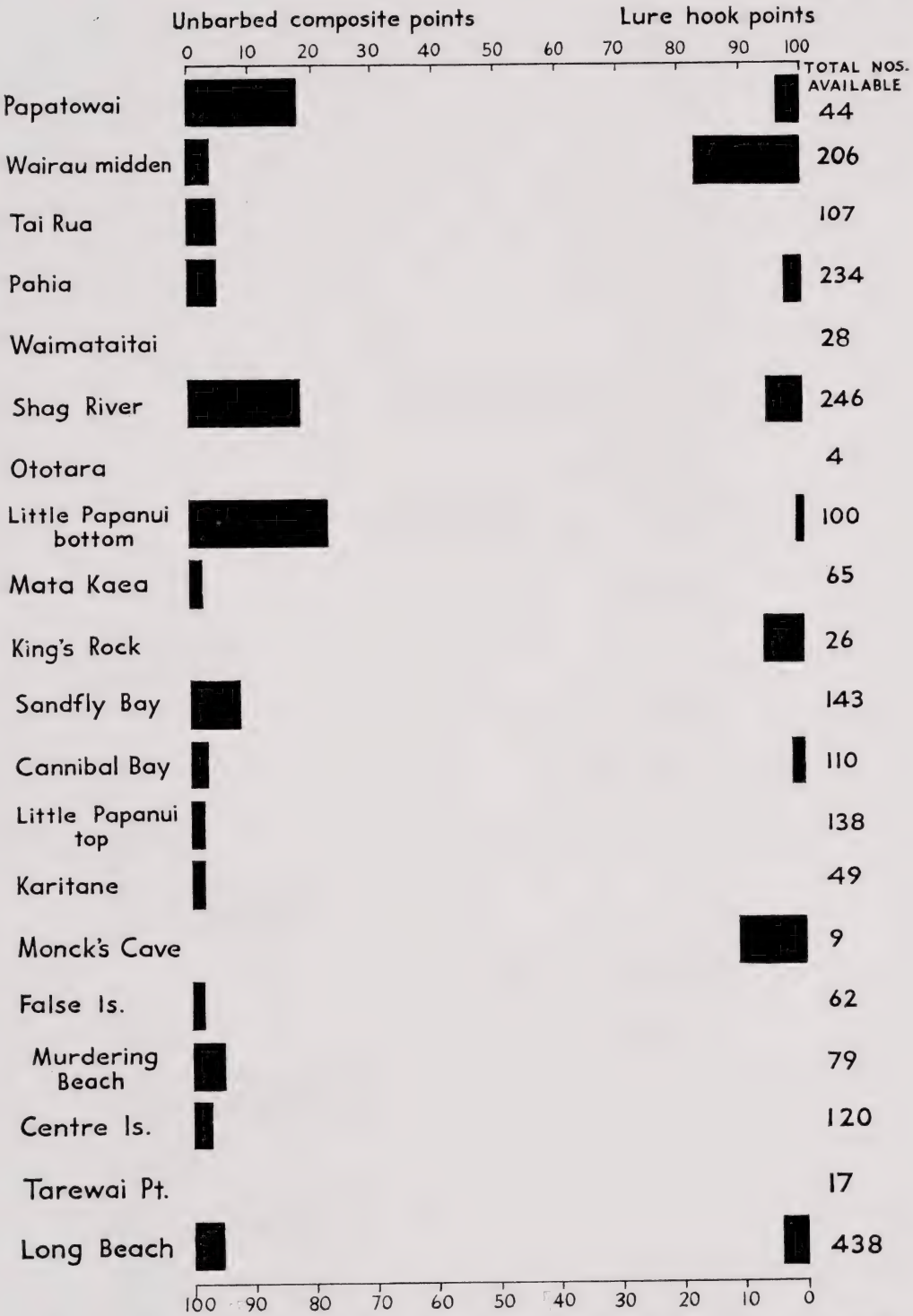


Fig. 61. Percentage distribution of bait hook points and lure hook points (excluding barracouta points).

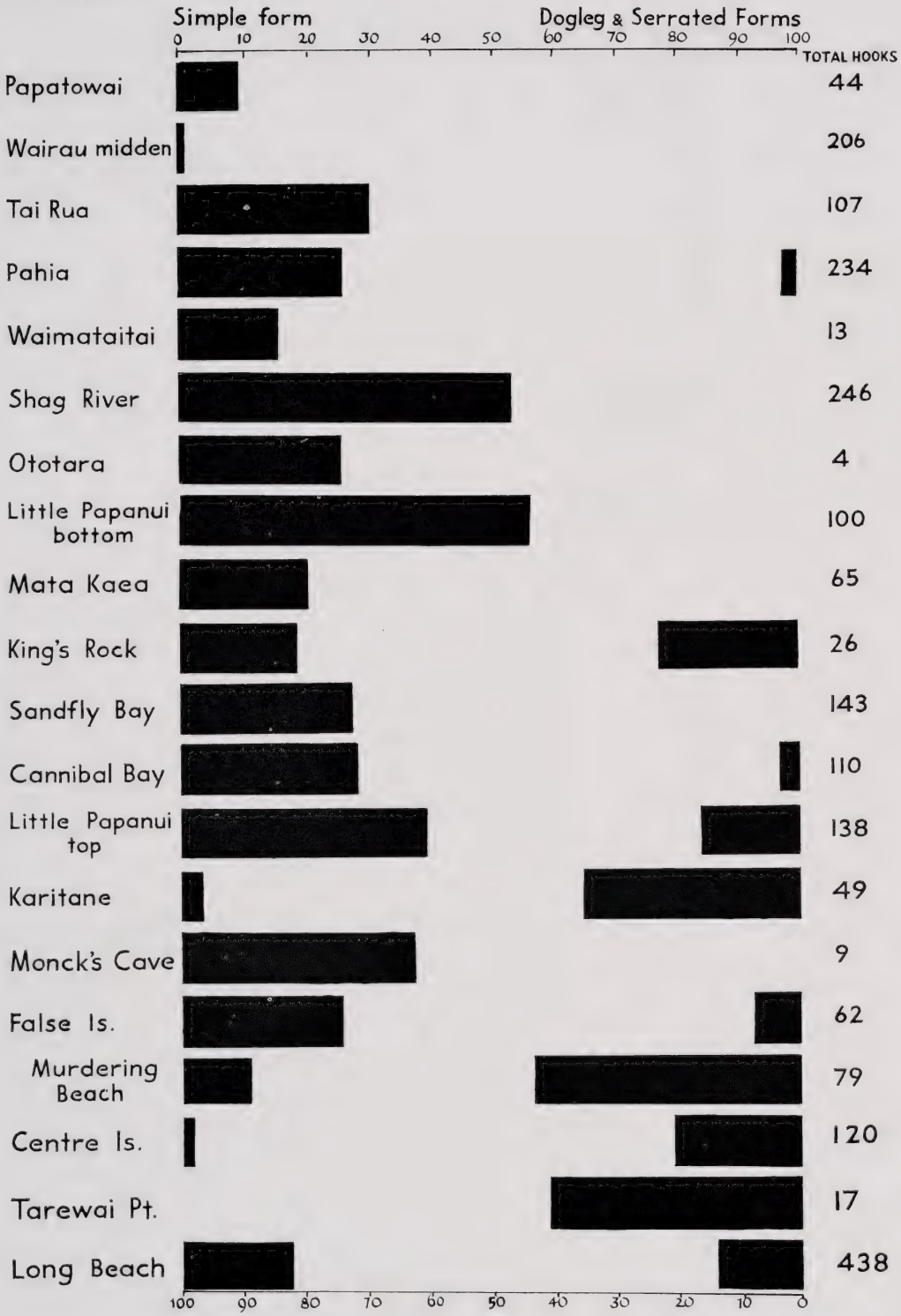


Fig. 62. Percentage distribution of simple, serrated and dogleg barracouta lure hook points.

Table 11. Grouping of sites by area and sequence of fishhooks.

	Southland	S. Otago	Otago	N. Otago	Canterbury	Marlborough
Group 4	Centre I	False I Cannibal Bay	Tarewai Pt Long Beach Murdering Beach Karitane Little Papanui top		Monck's Cave	
Group 3		King's Rock	Sandfly Bay	Matakaea		
Group 2	Pahia		Little Papanui bottom	Ototara Waimataitai Tai Rua		
Group 1		Papatowai				Wairau Bar

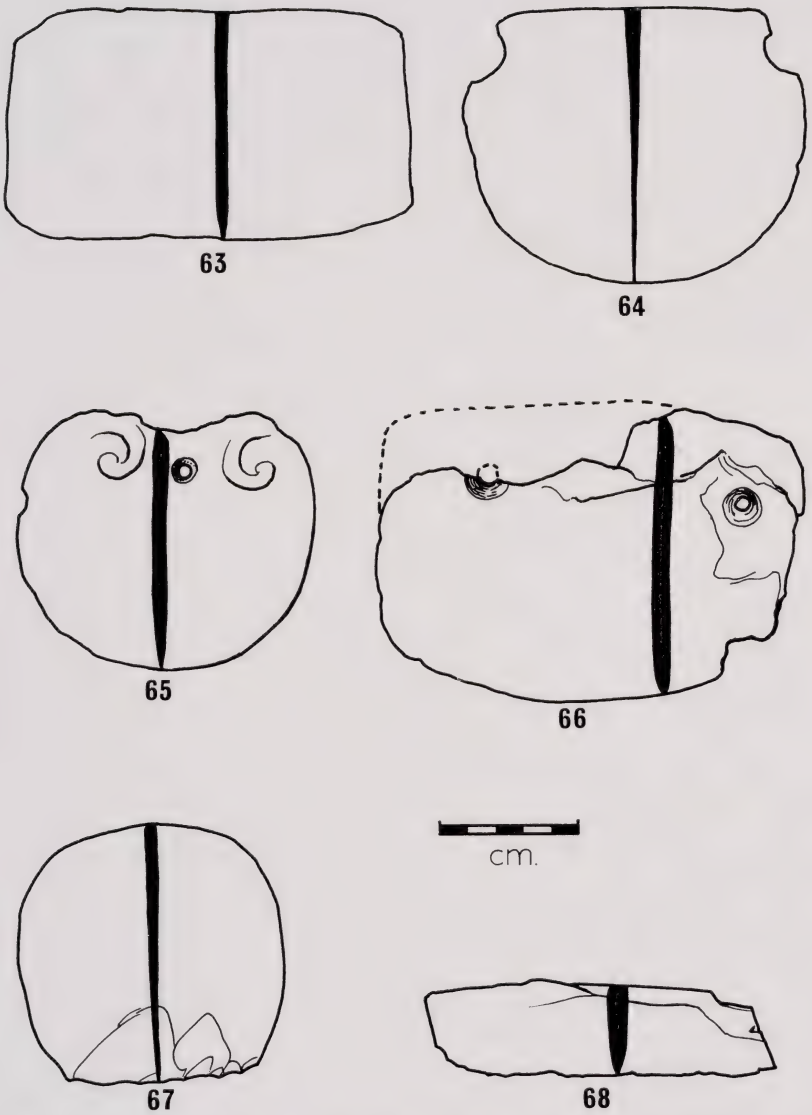
Artifacts forming Discontinuous Sequences

In Table 12 the site distribution of a number of items is recorded in so far as they are known from museum and private collections. These items are restricted in time and often exhibit a markedly regional distribution. Table 12 is not an exhaustive catalogue of all occurrences of these items. Trade beads and clay pipes are of European origin and are important time markers for the late sites. Unfortunately, because they are European they have often not been considered worthy of inclusion in collections. Patu, tiki, perforated human teeth, imitation human teeth, combs, kinky pendants, tattoo chisels, hei matau, greenstone pendants, toggles, flutes, barbed point pendants (a barbed fishhook point shape), are all mainly restricted to the later periods of prehistory. Some items, such as the small bird bone tube for a necklace, occur both in early and late sites but do not appear to be present in many intermediate sites. Carcharadon shark teeth perforated at the base, are used in the early period as ornaments but are recorded by Captain Cook as teeth on knives for cutting up human flesh. The other ornament forms, the imitation shark tooth, whale tooth unit, the whale tooth copy in stone, reels, *Dentalium nanum* shell beads, perforated cetacean teeth, seal teeth and divided sphere are restricted to earlier sites. The chevron pendant, which takes a number of forms, is extremely interesting and important, but seems restricted to the middle series of sites. Polished slate or stone knives (Figs. 63-68) commonly known as rectangular stone knives, or by the Eskimo name of "ulu", are found only in quantity in early sites and rather quickly become obsolete. This form, which has important implications for the prehistory of the Pacific Basin, is so far restricted entirely to the South Island and is one indication of the possible multiple origins for the settlement of New Zealand.

Outline of Site Chronology and Possible Sequences

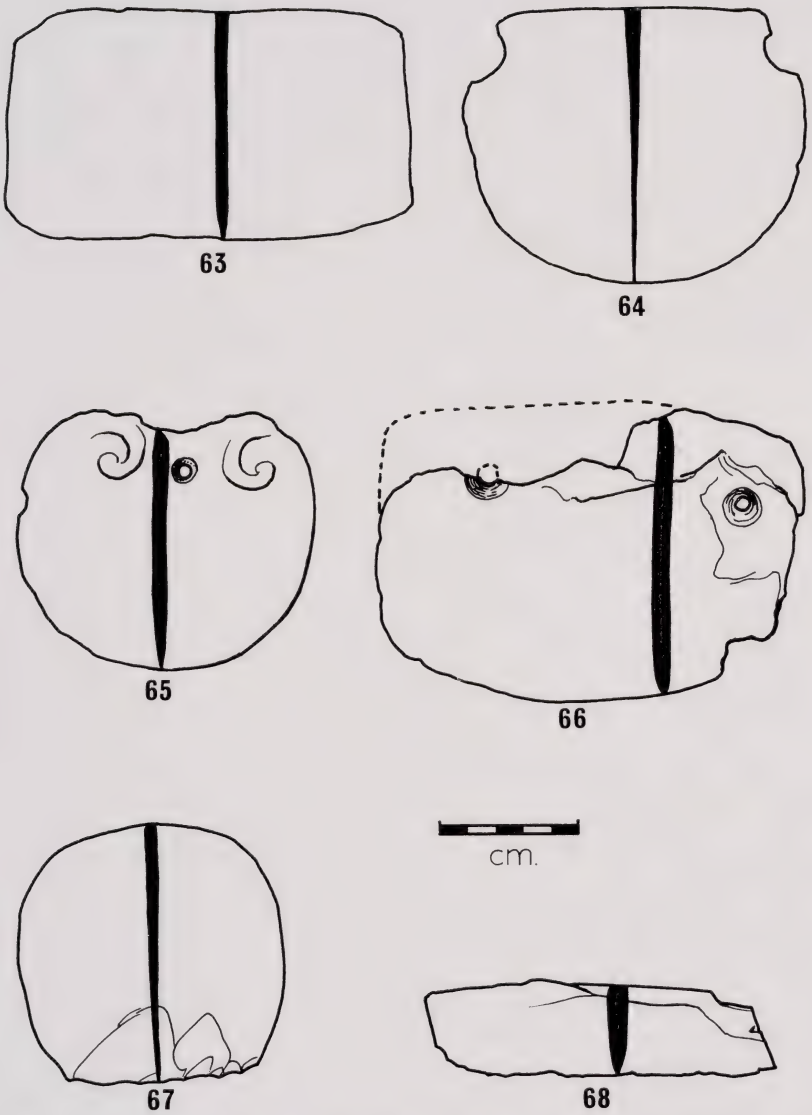
The three separate analyses presented here can each be explained in terms of a circular argument.

This is true if each analysis is taken separately, but when all are taken together then the general agreement as to the placing of sites in groups can be taken as some



Figs. 63-68. Polished slate or stone knives from the South Island, typical forms (after Simmons 1967).

Between pages 46 - 47



Figs. 63-68. Polished slate or stone knives from the South Island, typical forms (after Simmons 1967).

Table 12. Numerical distribution of ornaments, etc, in South Island sites.

	Trade beads	Clay pipes	Patu	Tiki	Perforated human teeth	Imitation human teeth	Combs	Kinky pendant	Tattoo chisels	Hei matau	Greenstone pendants	Toggles	Flutes	Barbed pt. pendant	Perf. dog teeth	Bird bone tube	Adze pendant	Cloak pin	Ear pendant (bone)	Pierced shell	Carcharadon teeth	Imitation shark	Whale tooth unit	Whale tooth stone copy (small)	Large & small reels	Dentalium beads	Perf. cetacean teeth	Perf. seal teeth	Chevron pendant	Whale tooth stone (lge)	Divided sphere	Polished stone knives
Long Beach, top layers	1	1	1	1	1	19	2	1	5	5	4	4	2	.	3	5	.	9	.	1	.	.	.	.	.	.	.	.	.	.	.	.
Kaikai's Beach, top layers	5	5	2	3	10	.	5	2	3	2	6	8	7	2	.	2	6	3	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Murdering Beach	.	.	7	22	3	9	8	2	3	6	27	7	9	2	1	1	3	8	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Katiki Pt	.	.	.	.	.	1	.	.	.	.	.	.	1	.	.	.	1	.	.	.	.	.	.	.	39	.	.	.	.	.	.	.
Karitane	.	1	2	1	8	.	.	2	.	1	.	3	1	1	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Tarewai Pt	.	4	2	.	8	.	8	1	3	.	5	3	7	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Little Papanui, top layers	.	.	4	.	29	.	5	4	6	1	1	7	8	1	2	4	2	5	1	1	.	.	.	.	.	.	.	.	.	.	.	.
Pene Bay, Pahia	.	5	2	5	20	121	3	3	3	6	9	4	13	5	.	5	.	4	1	.	.	.	.	.	.	.	.	.	.	.	.	.
Onepoto	.	.	.	.	.	1	.	.	4	1	7	.	.	.	.	.	.	1	.	1	6	.	.	.	10	.	1	.	.	.	.	.
Purakanui	1	1	2	1	89	.	2	2	3	2	11	2	2	2	.	.	3	.	1	.	.	.	.	.	200	.	.	.	.	.	.	.
Centre I	.	.	.	1	2	.	.	3	.	.	2	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Puketeraki	.	.	1	.	.	.	.	1	.	3	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Waipapa	.	.	.	.	.	.	.	2	.	1	3	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Wickliffe Bay	.	1	.	.	1	.	.	.	.	.	1	.	.	.	.	.	1	2	.	.	2	.	.	.	.	.	.	.	1	.	.	.
Moeraki	.	.	.	.	.	1	.	2	2	1	3	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
Sandfly Bay	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
False I	.	.	1	.	.	.	1	1	2	1	.	.	1	.	.	.	.	.	.	1	.	.	.	.	1	.	.	.	.	.	.	.
Rakaia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
King's Rock	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	1
Cannibal Bay	.	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	1	19	2	.	.	.	.	.	.
Moe Bone Pt Cave	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
Hoopers Inlet	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	1	.	.	.
Papanui Inlet	.	.	.	.	.	.	.	.	3	1	.	1	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.
Shag River	.	.	1	.	.	.	1	.	2	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	6	44	.	4	1	.	.	20
Little Papanui, bottom layer	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	14	3	.	3	1	.	.	3
Pahia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	24	1	.	107	240	.	.	.	.	.	.
Sumner	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	10	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
Pareora River	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Long Beach, lower layer	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	86	6	.	.	.	.	.
Kaikai's Beach, lower layer	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	1	.	12	.	39	.	.	.	1
Hurunui	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.
Papatowai	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	46	2	.	2	3	4	.	.	.	.	2
Fortrose	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	15	.	6	.	.	.	.	1	.	.
Waitaki	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	3	5	.	.	.	.	.	52
Pounawea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	3	6	.	46	104	4	.	.	.	.	2
Wairau Bar Burials	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	12	.	.	1	.	38	.	83	6	66	.	798	1	.	1	.	.
Wairau Bar Midden	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	78	.	5	.	16	9	4	42	.	41	1	.	1	.	.	1	1

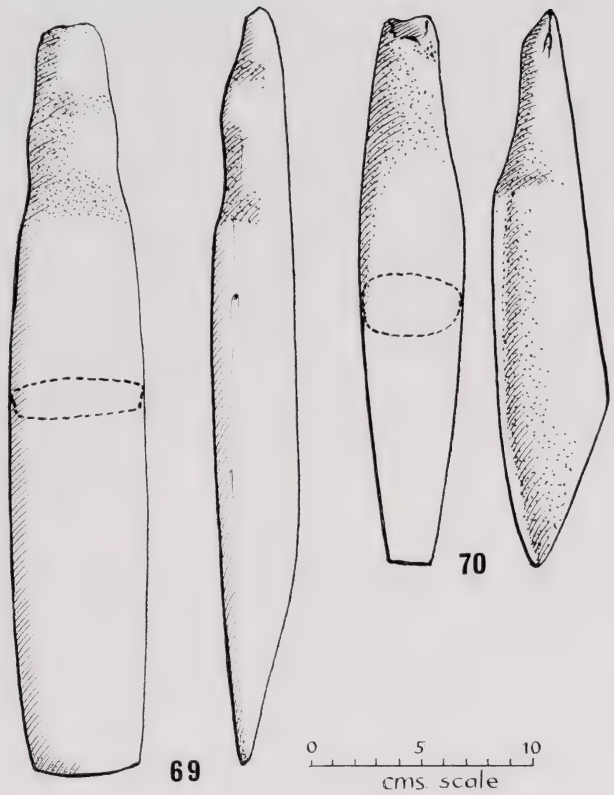
indication that these sites stand in certain relationships to each other. The major hypothesis which emerges from this relationship is that of an evolutionary sequence in the various items of material culture — a hypothesis which has been demonstrated for fishhooks by Trotter (Trotter 1965b) in his North Otago excavations, and for adzes at Little Papanui (Simmons 1967), though the latter is not a satisfactory archaeological demonstration. Many of the sites represented in museum collections are now destroyed, so that testing of this hypothesis is no longer possible at these sites, but this is immaterial to the general pattern which, if valid, should represent a testable hypothesis. By the very nature of the material used, mainly museum artifacts, it is to be expected that while the general pattern will stand up archaeologically, the details of any sequence will be modified. This is the reason why sites are grouped and not placed in a definite sequence. All that can be said with any surety is that certain assemblages have close relationships, and others differ in various degrees from these while more closely resembling other groups. In other words, one can only assess very crudely, degrees of similarity and difference between artifact assemblages. The resulting sequences for each area are given in Tables 13-18.

Table 13. Grouping of Southland sites, sequence.

	Adzes	Flake Material	Fishhooks	Ornaments
Group 4			Centre I	Pene Bay, Pahia Centre I
Group 3	Orepuke			
Group 2	Pahia Tokanui Mouth	(Wakapatu)	Pahia	
Group 1	Clifden	(Riverton)		Pahia Fortrose

( ) after Leach 1969

There are insufficient sites included in the analysis of Southland (Table 13) to form a valid sequence of groups. The Clifden adze cache certainly belongs in Group 1 as the adzes are identical in all respects to early adzes from Waitaki River Mouth or Wairau Bar Burials, even to the material used. The Pahia adze kit is a quite distinctive regional development (Figs. 69-70) and would suggest that the true placing of Pahia could be in Group 2, though, because Pahia is an abundant sea food area, it has probably been occupied as long as man has been in Southland. Two flake assemblages of Southland, Wakapatu and Riverton have been subjected to a computer analysis by Leach (Leach 1969). Radio carbon dates place Wakapatu about A.D. 1270. Riverton has various dates from A.D. 1204 to 1470 (Leach 1969, p. 65). Centre Island was a centre of late Maori occupation, though there is much earlier material on the island, the majority of the museum artifacts having been recovered from the late sites, which were attractive to collectors because of the presence of greenstone.



Figs. 69, 70. Typical examples of the Pahia adze kit. 69. Double front grip quadrangular, A.M.27684. 70. High rounded reversed quadrangular form, A.M.30132.

Table 14. Grouping of South Otago sites, sequence.

	Adzes	Flake Material	Fishhooks	Ornaments
Group 4			False I Cannibal Bay	
Group 3	King's Rock	Moa Flat (Papatowai) Cannibal Bay King's Rock	King's Rock	False I
Group 2	Papatowai			
Group 1	Pounawea	Papatowai Pounawea	Papatowai	Pounawea

( ) alternative or complementary placement

The sequence of sites for South Otago (Table 14) has already been well established by Lockerbie (1959). The analysis of the available artifacts indicates that simple analysis of the museum collections from these sites, without attempting to use the layer collections still being studied by Lockerbie, places these sites fairly well in the order suggested by him. Radio-carbon dates for these sites suggest that Pounawea was occupied from the 12th century; Papatowai from the 12-13th century; Cannibal Bay in the 16th century; False Island from the late 15th century, but mainly in the 17th century (Lockerbie 1959).

Table 15. Grouping of Otago sites, sequence.

	Adzes	Flake Material	Fishhooks	Ornaments
Group 4	Murdering Beach Tarewai Pt Little Papanui, top	Karitane Murdering Beach Kaikai's Beach, top Little Papanui, top	Tarewai Pt Long Beach Murdering Beach Karitane Little Papanui, top	Long Beach, top Kaikai's Beach, top Murdering Beach Karitane Tarewai Pt Little Papanui, top
Group 3	Sandfly Bay Little Papanui, mid	Little Papanui, mid Anderson's Bay Onepoto Matarae	Sandfly Bay	Sandfly Bay
Group 2	Little Papanui, bottom	Murdering Beach, Moa-hunter Kaikai's Beach, lower Little Papanui, bottom (Anderson's Bay)	Little Papanui, bottom	Little Papanui, bottom Long Beach, lower Kaikai's Beach, lower
Group 1				

( ) alternative or complementary placement

It will be noted that none of the sites in Otago (Table 15) — and this means the area around Dunedin Harbour — falls within Group 1. The grouping of layers and sites into the other groups appears relatively consistent. Many of the sites included here, such as Sandfly Bay, Anderson's Bay, Long Beach and Tarewai Pt, cannot be placed in any sequence except from their artifacts which are now in Otago Museum, as they have been destroyed. Group 2 sites probably belong between the 14th and 15th centuries, while the Group 4 sites are representative of an intrusive dominant culture of Classic Maori origin, which was later influenced by European contact.

Table 16. Grouping of North Otago sites, sequence.

	Adzes	Flake Material	Fishhooks	Ornaments
Group 4	Katiki	Katiki		Katiki
Group 3	Shag R, top	Tai Rua Kyeburn (Shag R)	Matakaea	Moeraki
Group 2	Shag R bottom (Waitaki R)	Shag R Pleasant R (Waitaki R) (Oturehua)	Ototara Shag R Waimataitai Tai Rua	Shag R
Group 1		Waimataitai Waitaki R Oturehua		Waitaki R

( ) alternative or complementary placement

Michael Trotter's sequence for North Otago (Table 16) is in line with the radiocarbon dates which place Waimataitai in the 13th century, Ototara in the 15th century, Tai Rua in the late 15th century, and Katiki in the 18th century (Trotter 1967c). Leach's date for Oturehua Quarry site is early 11th century (Leach 1969) and Hjarno's date for Shag River bottom layer is 12th century. This latter date comes from a different area of the site to Teviotdale's lower level and may represent an earlier occupation.

Table 17. Grouping of Canterbury sites, sequence.

	Adzes	Flake Material	Fishhooks	Ornaments
Group 4	Moa Bone Pt Cave, upper Monck's Cave	Bromley Monck's Cave	Monck's Cave	
Group 3		(Rakaia R)		Rakaia R Moa Bone Pt Cave
Group 2	Pareora R Motukarara Rakaia	Rakaia R (Monck's Cave) (Sumner)		
Group 1	Hurunui Sumner	Sumner Gray's Hills Pareora R		Hurunui Pareora R Sumner

( ) alternative or complementary placement

There are too few sites included from the Canterbury area (Table 17) for any suggestion of a sequence. The Sumner site on Redcliffs Flat was excavated by Haast in 1872 (Haast 1875a). Recent radio-carbon dates for what appears to be similar occupation on another area, place the earliest occupation at A.D. 1163 ± 82 (Trotter 1967b, p. 253). The surface artifacts from Monck's Cave include a range of Classic Maori artifacts, such as a bailer and combs (Skinner 1923).

Table 18. Grouping of Marlborough sites.

	Adzes	Flake Material	Fishhooks	Ornaments
Group 4				
Group 3				
Group 2	Wairau Bar Burials	(Wairau Bar)		
Group 1	Wairau Bar Midden	Wairau Bar Midden	Wairau Bar Midden	Wairau Bar Midden

Radio-carbon dates for Wairau Bar (Table 18) are A.D. 1015 ± 110 and A.D. 1225 ± 50 (Duff 1956, p. xii) from oven charcoal found at *c.* 43-76cm (17-30in) below the surface. This presumably dates the midden layer in an area not disturbed by burials.

Discussion

The general agreement in the order of sites when the separate analyses are taken together suggests that the four major divisions represent periods of change within South Island prehistory. These four divisions are thought to correspond with the ecological changes outlined earlier. Within each artifact class with a continuous distribution a tendency to change is apparent. It is a gradual process, with the cultural assemblage at any point in time being stable, until the intrusive Classic Maori culture absorbs the earlier culture.

Adzes and fishhooks of Period 1 belong to the New Zealand form of East Polynesian culture. The adzes are more often than not rendered in baked argillite from the D'Urville I.-Nelson region, and show an early dominance of triangular apex up with grip, and include a range of other adze types, but with only a very small proportion of reversed quadrangular with or without grip (e.g. Heaphy and Wairau Bar Midden). This latter contrasts quite strongly with material from sites such as Mt Camel, Houhora (report in preparation by F. W. Shawcross, surface collections, and N. Roe 1967), or from sites in Coromandel or Nelson where reversed quadrangular and triangular apex up adzes with or without grip are the dominants, with quadrangular front grip adzes occurring in the upper layer at Houhora (Roe 1967, p. 46). Regional variation could account for this distribution, but this is unlikely on two counts: firstly, the resemblance between the adze distribution of the Northern sites and early sites in the Pacific (see Green 1971, Fig. 2); secondly, the distribution of sites with three major foci (Far North, Coromandel, Nelson), and a number of single sites (e.g. Ohiwa, Wainui, S. Manukau

Hd), suggesting a group or groups able to expand into unoccupied territories. It is reasonable to assume these represent the Settlement Period of the East Polynesian Culture in New Zealand. Details of the artifact distribution for the North Island are the subject of a paper in preparation.

In terms of the Settlement Period adze material, the earliest (or what artifactually appears to be the earliest) sites in the South Island included in this study are the Heaphy site and the Wairau Bar Midden assemblages. The radio-carbon date of A.D. 1518 ± 70 for the Heaphy site dates the later phases of occupation (Simmons 1969, p. 16). Heaphy and the Wairau Bar Midden follow on from the North Island Settlement Period in that they have appreciable numbers of triangular apex up adzes with many fewer quadrangular front grip. Group 1, South Island, adzes belong to a specifically New Zealand version of the East Polynesian culture, as they do include some purely local developments such as the side hafted or the thin triangular apex down with grip (coffin shape). This latter adze, the coffin shape, while it is related to high triangular forms found in the Far North or the Marquesas Is, would appear to be purely a South Island form. Another factor is the identity of the adze forms represented. Except for the coffin shape, every other adze in the Group 1 collections can be matched exactly with other examples from Werahi Beach in the Far North or the Clifden cache in the Far South. The majority of these are rendered in argillite from the D'Urville-Nelson belt and cannot be localized on morphological criteria.

A feature which is illustrated by the Clifden cache (Fig. 71), from near Tuatapere in Southland, is that half of the Clifden adzes are made from D'Urville-Nelson argillite, the rest — including some not quite finished — from the local Orepuke argillite, indicating a movement from North to South.

Fig. 71. Clifden cache. (Field photo: L. M. Cowell.)

The four major periods of South Island prehistory as defined from the artifacts are in this study thought to be correlated with the following economic periods:

I THE EARLY PERIOD, South Island aspect of the New Zealand East Polynesian culture: *c.* A.D. 1000-1200.

Basic economy: coastal-forest hunting, with a wide range of sea-mammal and birds being exploited.

II THE MIDDLE PERIOD, South Island aspect of the New Zealand East Polynesian culture. Regional aspects, Southland, South Otago, Otago, North Otago, Canterbury, Marlborough: *c.* A.D. 1200-1400.

Basic economy: coastal-forest hunting, with a more restricted range of birds, few sea-mammals and much fish.

III THE INTERMEDIATE PERIOD, of New Zealand East Polynesian South Island culture. Local regional aspects, King's Rock aspect, Dunedin aspect, Central Otago aspect, Tai Rua aspect: *c.* A.D. 1400-1800 in Murihiku; *c.* A.D. 1400-1550 in Canterbury and North.

Basic economy: restricted forest hunting, sea fishing, with very little bird; a wide range of fish, shellfish and, initially, sea-mammals.

IV THE LATE PERIOD, South Island aspect of the Classic Maori culture. Canterbury-Marlborough aspect: *c.* A.D. 1550-1820. Murihiku aspect with some amalgamation of earlier cultural items: *c.* A.D. 1800-1820.

Basic economy: Canterbury, kumara agricultural until *c.* A.D. 1800, then kumara-potato; Murihiku, potato agriculture; both of which are associated with seasonal stations.

This overall delineation of the major periods obscures an important feature stressed earlier, that is, the developmental nature of the artifacts themselves. In Periods I, II and III the changes are gradual and cumulative from I to III. Period IV, while it does incorporate some Period III artifacts or forms, notably spade shouldered adzes and flake material, as in Murdering Beach, is, nevertheless, an abrupt and sudden intrusion of a new cultural group. Whatever the identity of the original settlers in New Zealand, the end product of change in the North Island produced a very different cultural group of Classic Maori, separated by at least six hundred years of development from the inhabitants of the South Island. In the artifact record the picture of slow and continuous development of the South Island is not disturbed until the intrusion of the Classic Maori. Any other intrusions that may have taken place are not detectable.

It is also significant methodologically that even when using surface material, an artifact analysis can suggest that there are four major peaks or foci of change in South Island prehistory. Thus it is possible to get an idea of the correct placement of a site by the analysis of a single artifact class, but more surety is given to this placement by the separate analyses of other artifact classes.

In the field, this placement may be corroborated or otherwise by other information, such as position of site, type of economy and raw materials used. On the basis of Museum studies an overall picture of site distribution can be formed and sites likely

to yield desired information can be identified for excavation. Many sites, though, have been totally destroyed and only the artifacts are preserved in Museums. In that case simple artifact analyses, such as presented here, show how these sites can be related to the prehistory of the area.

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ANTHROPOMORPHIC AND ZOOMORPHIC MAORI BOWLS FROM HAURAKI AND THE BAY OF PLENTY

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Abstract. A group of anthropomorphic and zoomorphic bowls are described and relationships suggested among them.

Zoomorphic Bowls

No. 45316 (Figs. 1, 2, 3) represents a portion of a wooden bowl from Ongare Point near Katikati on the Tauranga Harbour. This bowl was found during draining operations on a small swamp on Mr D. Earl's property at Ongare Point at grid reference NZMS1 N53 part 54/448820. The swampy area lies immediately below and around a small spur running out from higher ground. There is evidence of house terraces and filled pits on the spur covering an area of about a quarter of an acre. There are no discernible fortifications.

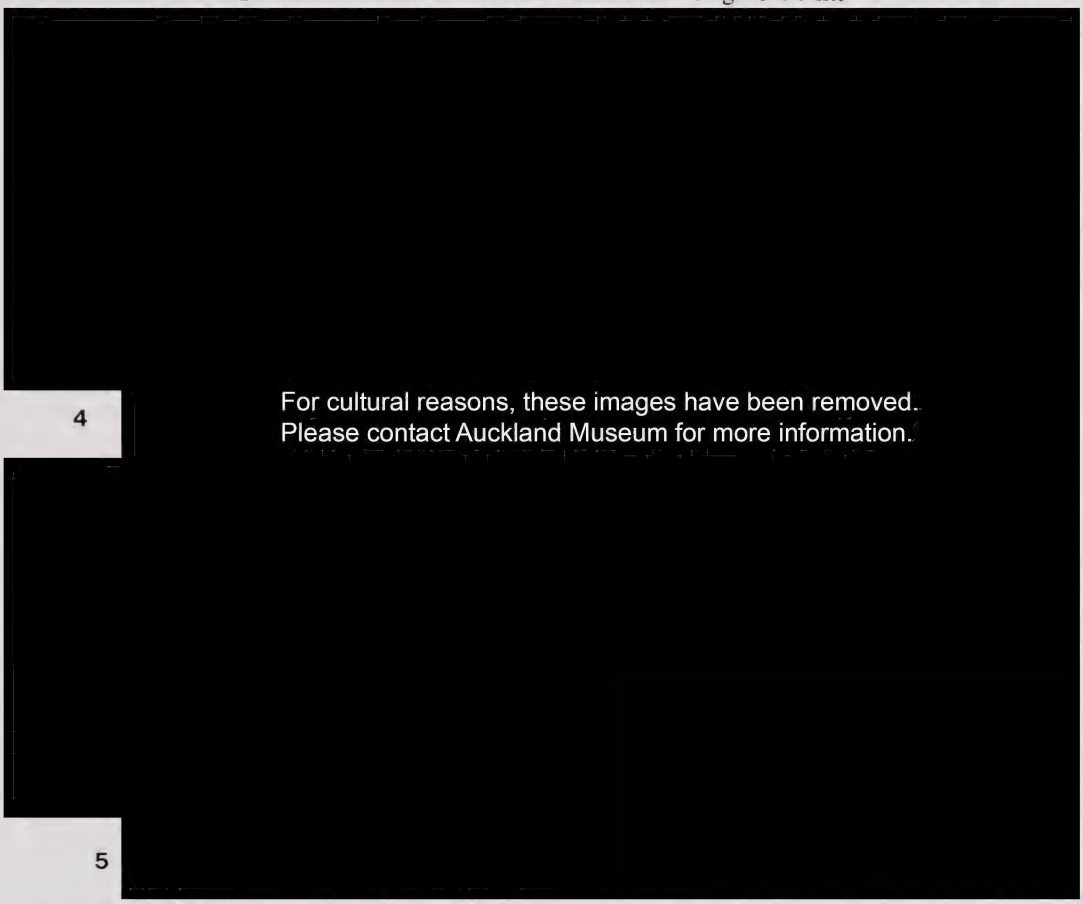
Figs. 1-3. 45316 Length 48cm. Ongare Pt. Dep. D. Earl. 1. Top view with side reconstructed. 2. Side view showing leg. 3. Detail of head.

The head fragment was initially noted by Wilson in 1962, in a memoir of the Whakatane Historical Society, at about the time it was handed over to Mr W. Ambrose, who was then engaged in excavations of a nearby pa at Kauri Point. Since that time it has been in the Anthropology Department at the University of Auckland. A recent find in the same area is part of the same bowl. These pieces have now been assembled in the Auckland Museum.

This bowl is unique in that its form is undoubtedly zoomorphic with a head which appears to be that of a bird. When found, the lower jaw or beak was still present, but this has since gone. Its rim form and geometric designs possess a very Polynesian appearance.

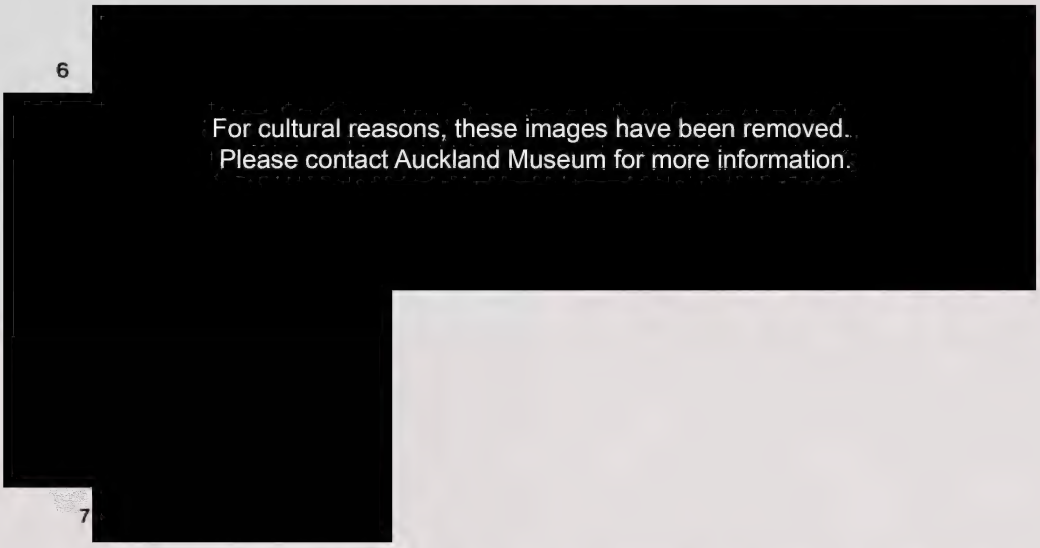
Associated with this bowl, was a godstick head with multiple eyebrows, which appears to be a local version of a Rarotongan *Tangaroa* figure (see Simmons, this volume).

No. 14015 (Figs. 4, 5) represents an unfinished bowl found by A. F. Allen on Motiti Island off Tauranga, not far from the first bowl. This bowl is 50cm long and has a bird shape body with a keeled neck leading to the head. The four legs would appear to be of a type similar to the one on the bowl from Ongare Point.



Figs. 4, 5. 14015 Length 50cm. Width 22cm. Motiti Is. Pres. Mrs A. F. Allen.
4. Side view. 5. Top view.

No. 45313 (Figs. 6, 7) is a beautifully finished bowl from Mangatarata, Hauraki Plains. It was found in 1971 by Bernard Harris in a small swamp below a pa at NZMS N52/882079. It is remarkable for two characteristics, the overall bird shape of the body in profile and a simple human head. Despite the latter, the bird image is reinforced by the tail-like handle and the positioning of the head.



Figs. 6, 7. 45313 Length 73.5cm. Mangatarata. Purch. E. E. Vaile. 6. Side view. 7. Detail of head.

No. 1197 (Figs. 8, 9) represents an unfinished bowl with four loop type feet from Awaiti Stream, Hauraki Plains. This bowl, of possible zoomorphic shape, was illustrated by Stevenson in 1939 (see his Fig. 16).

No. 4869 (Figs. 10, 11) is a pouring bowl from Kerepehi on the Hauraki Plains. While of fairly typical shape, the head on the handle and the presence of notching along the rim of this well finished bowl are both very different from most late examples of bowls. Also the keeled eyes of the head and its general form strongly suggest zoomorphic rather than human characteristics.

No. 44626 (Fig. 12) found at Kawakawa Bay by Mr G. Ryburn, is a large (125cm long) trough-like bowl with a well finished rectangular shape, internally and externally, and a flat bottom. At the rear, level with the rim, is a flat projection ornamented with carving. Part of this projection has broken off. Two holes have been pierced through this projection possibly for suspension. At the front the bowl is prolonged into an inclined pouring spout ornamented with carving. The underneath of this spout has been made into a human face with the nose on the underside and the tip of the spout projecting as a tongue. The carving is typical of the Hauraki style. The tail-like projection at the back and the anthropomorphic spout would suggest a relationship with 45313 from Mangatarata, though in this case body shape suggests neither an animal or human form.

Figs. 8, 9. 1197 Length 68cm. Width 19cm. Pres. H. Wood. 8. Bottom view. 9. Side view.

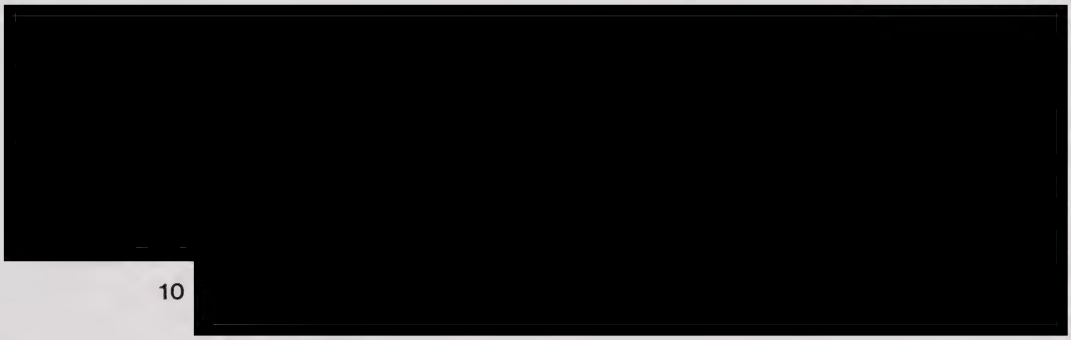
Discussion

It is possible to see a relationship between the Ongare Point bowl, 45316, the Motiti Island bowl, 14015, and the Mangatarata bowl, 45313. All share avian characteristics, yet as in late Maori carving of the *manaia* motif, the avian characteristics are alternated with specifically lizard or human forms and so gradually lose their avian association. The same alternation or replacement can be seen in the figures on the butts of wahaika clubs.

There is no way of determining age for these particular bowls. On the basis of style 45316 would appear to be the earliest in the series, with the unfinished example 14015 belonging to the same group. 45313 is probably later than these two. On the basis of other pieces with strongly Polynesian appearance, a guess date for 45316 and 14015 might be somewhere in the 13th Century A.D. A similar guess for 45313 would place it about the 16th Century A.D.

The other bowls figured do not fit this bird to man pattern but are zoomorphic. In the case of 1197 an animal form is represented, while in 4869 a mixed form with both human and animal characters is reflected. Other such bowls include one in Auckland Museum from Waikaretu, South Waikato (22968) which Stevenson (1939, Fig. 13) suggested "resembles a grotesquely fat animal with small head and a short tail" (1939, p. 206).

It is a moot point whether the head on 22968 in fact represents an animal or a human. Perhaps a parallel with it is to be found in dog-shape bowls. These Skinner illustrated in 1922 (see his Figs. 1-3) where he identified them as of Arawa origin. A dog-shape bowl from the G. Mair Collection now in Otago Museum, is identified by Mair as being that named Potakatawhiti. This is the dog that was eaten by Toi-te-huatahi and led to the Arawa migration to the Bay of Plenty (see Grey 1928, p. 54, as written by Te Rangihaheke), making it appropriate for Arawa chiefs to be served from such bowls. They appear to form a special class of zoomorphic bowls.



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Figs. 10, 11. 4689 Length 66.5cm. Width 19.8cm. Kerepehi. Pres. H. E. Vaile.
10. Top view. 11. Side view.

Fig. 12. 44626 Length 125cm. Width 31cm. Kawakawa Bay. Purchased E. E. Vaile.
(Photo: Vahry)

Another zoomorphic form would appear to be that of a lizard as evidenced by bowl 4869 from Kerepehi. This motif may also be the basis of 44626 from Kawakawa Bay. The classic Maori *manaia* form appears to mingle elements of both bird and lizard and it is not unlikely that, given bird-form bowls at an earlier stage, lizard-form bowls should also be present. At present, however, the forms can only be identified as animal rather than bird, and perhaps lizard.

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"GODSTICK" HEAD FROM KATIKATI

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At the same time as the bird-headed bowl second fragment (Simmons, this volume), a "godstick" head (Figs. 1, 2) was found at grid reference NZMS1 N53 part 54/448820. The identification as "godstick" is made in view of it probably being the head of a ritual baton used in religious ceremonies. The total length of the piece is 16.5cm, maximum width 6.3cm. The wood is probably totara.

A baton in Auckland Museum (37148), found at Te Puke by Mrs T. Gilpin in 1960, has a similar knob decorated with an Oceanic type smooth stylized, though naturalistic face, with raised eyes, straight nose and realistic lips. From beneath the lips to a point halfway up the nose is an incised line, like a single tattoo line. The baton has a round shaft 2.5cm in diameter leading to a stylized penis with two circular "ear" projections on either side of the base. The underneath line and either side of the groove marking the *glans penis* are decorated with notches. At the top base of the penis an oval hole has been cut and hollowed out in the length of the shaft. Size of this hole is 2.5cm long by 1.4cm wide, the interior hole penetrating up the shaft for about 6cm. The overall length of the baton is 34cm, the head 11.5cm, the shaft 13.5cm, and the penis 9cm in length. The tip of the penis is, from the back, keeled and decorated with notches. Notches are used as the normal decorative feature as in the head from Katikati.

The Katikati head from the top is furnished with identical planes to those placed on the tip of the penis of the Te Puke baton. Size relationships between the two heads and shafts are as follows:—

	TE PUKE	KATIKATI
Overall length of head	11.5cm	13cm
Maximum width of head	5cm	6.2cm
Shaft diameter	2.5cm	3cm

It can be seen from this that the Katikati head belongs to a slightly larger object. The presence of notching on both, taken with the structural similarities, suggests that the Katikati head belongs to a baton or "godstick" of similar type to that from Te Puke.

The presence of three pairs of eyelids on the Katikati head and raised central eye portion evokes the style used on the *Tangaroa* figures from the Cook Islands (Oldman 1943, pl. 1, 2). The penis end on the Te Puke baton also evokes that of the *Tangaroa* figures (Oldman, pl. 3). The use of decorative notching could be purely a New Zealand feature, though may be related to similar decorations on other Cook Islands pieces (Oldman pl. 9, no. 381), or Tahitian (Oldman, pl. 10, no. 383, pl. 28, no. 371). Multiple lidded eyes are also present on Cook Island spears (Oldman pl. 22, no. 446, pl. 34, no. 443).

Rec. Auckland Inst. Mus. 10: 65-67 December 17th, 1973

Figs. 1, 2. Katikati head. 1. Front view. 2. Back view. (Photo: Dominion Museum)

Conclusion

The Katikati head is probably from a ritual baton similar in form to the Te Puke baton. The decorative style of the Katikati head evokes style comparisons with Cook Islands, while the Te Puke baton has a penis end similar to the large Cook Islands staffs. It could be suggested that both the New Zealand specimens predate the development of classic Maori carving and that the use of decorative notches on chevron pendants or adzes of probable early date and on these pieces, suggests that we are comparing objects from New Zealand belonging to some time prior to 1500 A.D. with Polynesian pieces of the 18th Century. In view of the other pieces with East Polynesian art style resemblances, the Kaitaia carving in Auckland Museum, Uenuku in Te Awamutu Museum, and a canoe prow in Taranaki Museum, it is possible that in New Zealand we had either an undifferentiated East Polynesian style which was that of Polynesia at the time the Maori ancestors left, or discrete migrations from different areas of Polynesia. Considering the development of distinctive adze types and other features in the various island groups as recorded in the 18th Century, it is likely that art styles underwent a similar development. The early New Zealand examples may then represent more closely the original art style of East Polynesia before marked regional variation had occurred, even though the New Zealand examples themselves have undergone some development in New Zealand. The swamps of New Zealand thus continue to be an important repository for earlier style New Zealand carvings similar to the Polynesian.

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THE LAST INITIATION CEREMONY AT GUPUNA SANTA ANA, EASTERN SOLOMON ISLANDS

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Abstract. This paper is based on a set of photographs which records the last initiation ceremony held in the village of Gupuna on the island of Santa Ana in the Eastern Solomons. The photographic record and an ethnographic description are brought together not only in order to present facts which were not previously available but also to give a fuller understanding of what initiation in Santa Ana entailed.

Initiation into the bonito cult was formerly a central institution in certain cultures in the Eastern Solomons. Descriptions of the initiation ceremonies were recorded for Sa'a, Ulawa and the Arosi area, north of San Cristobal by Ivens (1927) and by Fox (1925). Mr Geoffrey Kuper, himself a Solomon Islander, published in the Suva Medical Practitioner in 1937, an account of the ceremonies held at Santa Ana. His account was based on actual experience as he was initiated at Natagera late in the 1920s. It is evident in his account that the forces of acculturation had already had a marked effect upon the bonito cult and that it was in danger of being phased out.

In 1943, during World War II, an initiation ceremony was held in the village of Gupuna in Santa Ana. This was the last initiation ceremony held in this village and the whole event would have passed unnoticed and unrecorded had it not been for the fact that high ranking officers of the American Armed Services, then stationed at Guadalcanal, accepted an invitation to attend the public part of the ceremony. General Howard, Commander Wilson, officers of the Medical Corps and other officers visited the island, some by flying boat (Fig. 1). Official Service Command photographers made a photographic record of the day's activities and a set of the photographs taken was presented by a Major Merrill Moore of the Medical Corps to the Auckland Institute and Museum, in May, 1944.

The photographic record of Gupuna's last initiation ceremony is a legacy of great ethnographic value not only for the anthropologists presently interested in the Eastern Solomons but also for the people of Santa Ana itself. An important historical moment was recorded. In 1956 the last Santa Ana initiation ceremony was held in the village of Natagera. It is unlikely, as discussed in the conclusion, that another one will ever be held in Santa Ana. For the people of Santa Ana, therefore, the photographs record the passing of a great native institution whose demise they seemed powerless to prevent. But it is remembered with nostalgia and fondness as yet another native Solomon Island custom which had to give way to the mixed blessing of modern progress.

There are thus good reasons for publishing at least some of the photographs which have been stored so long in the archives of the Auckland Museum. Besides presenting the Eastern Solomon Islanders with a part of their history and heritage, the photographic record furnishes ethnographic data of value to anthropologists and art historians. The only extant visual record of the initiation platform used in Santa Ana is presented here. Of importance also is the visual documentation of the material paraphernalia which is associated with the initiation ceremony.

Rec. Auckland Inst. Mus. 10: 69-95 December 17th, 1973

Fig. 1. Port Mary at the village of Gupuna, in Santa Ana. The American visitors arrived by flying boat thus affording the local people their first exposure to such machines.

In this paper I present a selection of the photographs, here published for the first time, and provide such background ethnographic information which will help place the photographic record in cultural context. Emphasis is upon ethnographic description rather than theoretical discussion but not exclusively so.

The Context of the American Visit

It was to the final day of the initiation ceremony, known locally as *maraufu*[1], that the Americans were invited. I will describe briefly what had occurred before the public event and then return to the activities which were covered by the photographic record. My information on the initiation ceremony is based largely on Geoffrey Kuper's written account but it is supplemented by discussions with him and others at Gupuna and on data collected during a period of fieldwork in the area.

A *maraufu* was held every five or six years but the exact timing of the event was decided by the elders and owners of bonito fishing canoes *(againiwaiau)*. The decision was determined in part by the availability of canoes and fishermen, the wealth holdings of the parents, the prospect of good crops and anticipated success in overseas trading. Once the decision is made it is assumed by everyone that economic conditions are favourable. Food supplies are adequate and there is a sufficient number of pigs available for the final feast. I will argue later in this paper that interference with the economic base of the *maraufu* ceremony helped bring about its demise.

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[1] In Ulawa and Sa'a, which is at the southern tip of Maramasike Island, the cognate term is *malaohu* (Ivens 1927: 344).

The ideal age at which a boy should become a *maraufu* candidate is difficult to determine. Geoffrey Kuper was 12 years old. Apparently, on payment of red shell money known as *faga* (worth $24 Australian now, but two pounds in 1936) boys from other villages could be included in the group and very young boys down to 8 years old would be accepted. Kuper expressed the opinion that it was unusual formerly to include boys as young as 8 years. Nearer the ideal were ages of 12 up to the late teens. In this respect Santa Ana was more conservative than either Ulawa or the Arosi area where according to Ivens (1927 : 472) even breastfed infants were segregated in the custom house. Mothers were required to visit the custom house regularly in order to breastfeed their sons. Strictly speaking and under normal circumstances women are not permitted near the custom houses.

The father of a *maraufa* candidate had to select the fishermen and the canoe on which his son is to "catch" his first bonito. The owner of the canoe *(againiwaiau)* and the father come to an arrangement which is "sealed" by payment of shell-money to the owner.

When Geoffrey Kuper was initiated there were fears among the islanders that there might not be another initiation ceremony. Thus Geoffrey's parents, Mr Henry Kuper and Kanana, decided that their younger sons of 10 years and 8 years respectively should go through the ceremony. Furthermore it was decided by the elders to reduce the period of seclusion from one year to six months. By contrast, the normal period of seclusion in Ulawa was three to four years but Ivens (1927 : 137) made it clear that the length of seclusion depended very much on the availability of adequate provisions and wealth. A further indication of changed circumstances in Santa Ana was the fact that only in the village of Natagera were there custom houses where the boys were to be secluded.[1] Neither Gupuna nor Nafinuatogo possessed custom houses, whereas, ideally, every major village should have had its own custom houses and did formerly.

On the first day of the *maraufu* cycle the boys to be initiated gather at the custom houses and are divided into two groups one to each house and each under the care of a *mwane-apuna,* or priest. Once they enter the custom houses the period of seclusion begins. The boys are required to eat and sleep in seclusion and every attempt is made to keep them free of ritual defilement. They are told by the *mwane-apuna* what is required of them. They are to be quiet, orderly and obedient and once they have followed faithfully all the instructions given they will acquire the status of men.

Early the next morning the boys go to the sea and bathe. On return to the custom house, or *aofa,* they breakfast on cooked yams, coconuts and fresh water. This is to be their regular diet for most of the seclusion period. From this time onwards the fishermen will avail themselves of every opportunity to take out on a fishing trip the initiates for whom they are responsible. If the fishing is poor a canoe might go out several days before making a successful catch on an initiate's behalf. Wealthier fathers will try to select fishermen of "charmed" reputation and canoes which are renowned for their success in order to spare their sons the embarrassment of failure.

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[1] While in the field I saw the two Ngatagera custom houses in which Geoffrey Kuper and his *maraufu* companions were secluded. These fine houses, rich in decorated posts, burial canoes, skull containers, ceremonial bowls and bonito fishing canoes were the last of their kind in the area. Unfortunately both were totally wrecked by a cyclone at the end of 1971.

There are four fishermen to each *againiwaiau*. Each has a bamboo rod some twelve feet long and a ten-foot line which trails either a one-piece hook *(tagi)* or a two-piece hook *(fariqafa)* if at the bow end or a composite lure *(teku)* if at the stern end. Occupying the privileged position in the canoe, is the man nearest the bow. He is expected to land more bonito than the others both by virtue of the freedom he is permitted and by virtue of his reputation. The man nearest the stern is also a fisherman of established reputation and he acts as a steersman. In Santa Ana there are two main attributes of a man of prestige. He can fight as a warrior and he can fish for bonito. For the more ambitious man "bigmanship" is a major concern. Among all the fishes of the sea, the bonito reigns supreme in terms of ritual value and food. The shark is associated with death and ancestor worship and thus never sought by fishermen. Shark is not food and Bernatzik (1936 : 71) plainly erred in listing shark as a food item.

When Geoffrey Kuper was taken out fishing his canoe left soon after breakfast and the crew paddled an estimated seven miles before encountering a school of bonito. The presence of a school is usually indicated by frigate birds which compete with the bonito for the small fish that bonito feed on. The water sparkles and boils with the feverish activity of hungry bonito and frigate birds. Such frenzied feeding usually attracts the sharks which prey on the bonito. The religious significance of the frigate bird - bonito - shark complex was discussed by Davenport (1971 : 408). Into this vicious circle preys man, the fisherman, who, like the shark, hunts for the bonito. The aim of fishermen is to position themselves in the centre of the circle catching the bonito while they are feeding and making sure that their canoe does not capsize because man is also akin to bonito. Should a man fall into the water he will be attacked and eaten by sharks with the same gusto that bonito are attacked. Moreover, he bleeds like the bonito.

The first bonito caught by the crew was handed to Geoffrey Kuper. He removed the hook from its mouth. Then he put his arms around it and hugged it to his body, the head of the bonito being just under the initiate's chin. He was then required to lie on his right side and remain hugging his bonito catch until the canoe reached the shore. Meanwhile, however, the fishermen continued fishing, trying to catch as many bonito as possible before the school broke up. Geoffrey Kuper's canoe returned to Natagera at 5 p.m., after a very long day with nothing to eat or drink except fresh coconut milk. The crew caught ten bonito that day and six other crews fished the same school of bonito and were equally successful.

For the initiates, the essential requirements are that the first fish caught by the crew become ritual fish which they must hug close to their bodies until the canoes return to shore. Each initiate and his bonito then go through several ritual acts, after which the bonito becomes sacrificial food for the priest, the initiate's father and male relatives of the initiate.

When the canoe finally approached the shore two men came out to keep it steady. A third man, who thereafter acted as Geoffrey Kuper's guide, approached the canoe. His first concern was to make sure that Geoffrey was all right and not suffering in any way. He took the fish from Geoffrey and threw it into the sea. Geoffrey was required to retrieve it. By doing this, the fish was washed clean of blood and so was handed clean to the guide. The initiate was also given an opportunity to wash himself because by this time he was covered with bonito blood from the bilge of the canoe.

After bathing the initiate was given a shield with which to cover his face from the gaze of the women. Covering the face was also a feature of the initiation cere-

monies at Ulawa and Arosi (Fox 1925 : 346, Ivens 1927 : 133). At Ulawa, according to Ivens, "it was held that any woman who saw a *malaohu* boy would die." It is particularly important at this time because a group of women had gathered to the right of the walled custom house enclosure. They wailed loudly as though he had died. My interpretation of the act of mourning is that the women realise that the *maraufu,* from this moment, is theoretically no longer a child. The child self has "died" and is replaced by an emergent adult self.

The initiate walked up the beach towards the custom house. In front of the custom house and on the seaward side was a platform, known as *reitao.* Sitting cross-legged on the *reitao* was the *mwane-apuna,* costumed in loincloth and shell-money. The initiate's bonito was handed to the priest by the guide. The women were excluded from this part of the ceremony and only men were present. The initiate approached the *reitao* and sat cross-legged in front of the priest. At this point the priest uttered an incantation. After this, he took a portion of coral lime and sprinkled it over the arms and chest of the initiate. Then he brushed the initiate's body with the leaves of the *siri,* symbol of the gardener. Now standing up with the bonito, the priest squeezed the gills of the bonito to extract a few drops of blood which he aimed at the mouth of the initiate. The initiate swallowed the blood. Initiates were also required to swallow a few drops of bonito blood at Ulawa (Ivens 1927 : 141).

I have chosen to base this portion of the description on an actual case, that of Geoffrey Kuper. What he experienced represents what is expected of each *maraufu.* Every boy must go through the ritual acts just outlined.

Up to this point in the initiation cycle the initiate has undergone a transformation by "catching" his first bonito. A man is not a man until he has been "blooded" by his first catch. Similarly, a bonito canoe is not a "proper" canoe until it has made its first catch. In essence, this is what the term *maraufu* refers to, namely, the acquisition of mature status or the transformation from a state of being nothing to a state of social acceptance and recognition. The transformation is realised by catching a bonito fish, by hugging it closely to the body, by being covered with bonito blood and finally by swallowing bonito blood. By these means and validated by the incantations of the priest and the presence of other men as witnesses, the *maraufu* assumes some of the "qualities" of the valued bonito.

After swallowing the blood the initiate is given a short rope and is asked to scale a coconut tree. However, he gets only part of the way up when he is asked to climb down again. This ends the activities of probably the longest day in the life of a *maraufu.* He goes straight to bed afterwards.

The fishing expeditions continue until every boy has been made a *maraufu.* In each case the first fish caught "belongs" to the initiate and after drinking its blood, the bonito is cooked in the custom house and eaten by the priest, the father and the male relatives of the initiate. Initiates are not permitted to eat bonito at this stage.

The boys go through a daily routine of walking along the beach, right on the water's edge so that their footprints will be washed away. Their faces are shielded from the women. They go to the same secluded location, swim and bathe, and then walk back in procession to the custom house. Then they eat. In the evenings they either play quietly among themselves or they listen to accounts of local folklore and traditions told by the priest. Seclusion provides many opportunities for education which is one reason why very young boys are not favoured for initiation.

Providing a regular supply of food for the *maraufu* is the responsibility of the parents. In the case of boys from other villages, the parents make arrangements with local relatives to take food to the custom house.

Two days before the public ceremony, which the Americans witnessed, each boy is required to act out a piece of dramatic play. He must "become" a bonito, dive into the sea and be "caught" in a net. This is done at two or three o'clock in the morning. I am not certain what the significance of the act is but would suggest that it is a way of differentiating bonito of the sea from bonito of the earth. The *maraufu* are caught by man and they will carry out the duties and functions of earthly "bonito". One of those functions is to hunt and catch bonito of the sea.

The next day soon after breakfast, each boy sits on his bed and awaits his turn at "licking the bone". The priest recites an incantation and then hands the *maraufu* a bonito vertebra bone which he must put into his mouth. Then the boy licks it with his tongue, several times. From this moment the *maraufu* are permitted to eat bonito and will partake that very night if the fishermen were successful that day.

After the "licking the bone" act is completed the priest cuts a lock of hair from each boy with a chalcedony knife, known as *naki*. Each boy is instructed to wrap his lock of hair in a piece of ivory-nut palm leaf and tie it securely with coconut fibre. When all bundles are ready the boys walk in procession along the beach to a special rocky location where the bundles are to be hidden. Concealment of the hair locks is supervised by the priests to ensure that adequate measures are taken. On no account must the hair be discovered by anyone. Unfortunately, I did not ask about the significance of hiding the hair but there are suggestions of a Polynesian concept of personal *tapu* and sacredness of the head and hair. For example, Santa Ana men will never crawl under a house which has a floor because women have walked on that floor; thus, there is danger of personal defilement.

After concealing the hair, the boys return to the custom house. All the necessary ritual acts are complete but for the public appearance the next day. Early in the morning the boys bathe and have a simple breakfast. Afterwards they oil their bodies with coconut oil and they begin to put on their ceremonial costumes which their fathers have brought for them. Up until this moment the boys have been quite naked. Donning the apron and wearing shell-money costumes dramatises the change in status of the boys. Getting ready for the public display on the initiation platform takes most of the morning. Each boy will be costumed in a manner which befits the social position of his family.

Building the Qea or Initiation Platform

The commencement of the initiation ceremonies coincides with the opening of the bonito fishing season. Construction of the *qea* or initiation display platform commences as soon as the first catch has been made. A different term for the platform is used at Ulawa, where it is known as a *tahe* or stage. Its full name is *tahe ni malaohu* (Ivens 1927: 142). Geoffrey Kuper described the *qea* as having an oblong ground plan and standing about 25 feet or approximately 7.6 metres high. It was richly carved with shark and frigate bird forms and with sculptures of warriors armed with spear or with bow and arrow. It was flat-roofed and covered all over with tree-fern and coconut leaves. On one of the upper corners was a life-sized carving of a man with a fighting spear in his hand and this figure could be turned so as to make it appear as though the spear

Fig. 2. The *qea* or initiation platform that was used in Gupuna in 1943. Decorations consist mainly of bonito canoe outlines, two above the central house and two on the sides of the platform. There are also wood sculptures of a mythical shark, known as *iri* visible on the right of the platform. Mr Henry Kuper stands behind the uppermost canoe. Note that the side of the canoe in front of Mr Kuper is decorated with three dimensional frigate birds and paintings of bonito fish. Below, on the side of the platform is another plank similarly decorated. No boards decorated in this way can be found on the island now.

would be thrown. On the other corner was a moveable figure of a warrior with a bow and arrow and this figure could be turned full circle. The platform had four doors, one on each side but Geoffrey Kuper did not explain what these were used for. The description above is based on what Geoffrey Kuper saw in Natagera in the late 1920s, probably in 1927.

Turning now to the Gupuna *qea* it will be noticed at once that the photograph presents additional information and evidence of change (Fig. 2). Firstly, there is a platform on which a house-like structure is built. Around the house is a walk-way which permits the initiates to walk around the platform. Secondly, there are two stairways up which the initiates must walk in a ritualised dance-like step. Wood sculpture on the Gupuna *qea* consists of four highly decorated bonito fishing canoes, two above the platform house and one on each side of the platform at right angles to the uppermost pair. There are also carvings of fish forms probably of the *iri* which represents a mythical shark. Life sized carvings of human forms are not evident in the Gupuna *qea* so that in spite of its elaborate and dramatic appearance the 1943 *qea* appears to be less dramatic and less ornate than the earlier *qea* described by Kuper. Its outstanding feature, according to Kuper, is the idea of building a smaller *qea* upon a larger one. This platform thus qualifies twice over as a *qea* and on that count must be regarded as great.

A comparison with Ulawa platforms, as illustrated in Ivens (1927 : 334) and in Bernatzik (1935 : Pl 13), shows that the Gupuna one is far more elaborate. The latter has two sets of stairways to the single centrally-placed stairway of Ulawa. Decorations of Ulawa platforms consist of painted fish forms and three-dimensional shark and frigate bird forms somewhat similar to those on the Gupuna platform but the overall effect is not as grand as in Santa Ana. However, Fox's (1927:348) illustration indicates that, formerly, Ulawa platforms were more elaborate than those featured in Ivens and Bernatzik. Fox suggested that the entire structure represented a bonito fish into whose body the initiates walked but this interpretation was questioned by Ivens (1927 : 142). In fact, the stage resembled a comb and was thus, called the *tahe arape* (stage-hair comb).

The varying complexity of initiation platforms is a consequence of "bigmanship" as each sponsoring leader and his group strive to out-do previous sponsors and set standards of excellence and opulence which are difficult for rivals to surpass. Under this kind of system it is inevitable that platforms would tend to become increasingly complex. Each successive sponsor is under an obligation to do at least as well as the previous sponsor but each would prefer to improve on past efforts. Artists are thus encouraged to be creative and innovative rather than being merely repetitive. What they produce are supposed to enhance the reputation of the sponsor who commissions them. The challenge to rivals takes the form of a large pig which is displayed during the public ceremony. To take possession of the pig, is to accept the challenge and become responsible for the next initiation ceremony. At the Gupuna ceremony, in 1943, the challenge pig was not claimed. What this means, according to Kuper, is that no *qea* of the Gupuna type will ever be built again. The implication is that one competitive series is over and the way is clear to begin another series. In simpler *qea* the challenge is a bunch of betel nuts, acceptance of which obliges the sponsor to build a *qea* of similar standard and type.

The Ceremonial Welcome

Some of the visiting Americans arrived by flying boat but General Howard and Commander Wilson came by submarine chaser. The General's party was met by an ocean-going canoe, known as *risu-e-rima,* into which the visitors transferred. This canoe brought the party close to the village where they were met by a party of warriors armed with the shield typical of this area, and a spear (Fig. 3). A war dance was performed and the warriors rushed down into the sea brandishing their spears (Fig. 4). The dance completed, the posture of menacing defiance was dropped and the warriors waded into the water to beach the heavy canoe and help the visitors ashore. This is shown in Fig. 5 which is interesting as it features a bonito canoe, or *againiwaiau,* in the background. This is the type of canoe in which the initiates are taken to "catch" their first bonito.

Once ashore the visitors were escorted by Mrs Henry Kuper, a woman of important social position in the Gafe matrilineage, and her daughter Clara (Fig 6). Mrs Kuper, who appeared to be also the chief tattooer of women in Santa Ana, died in 1970. The gala-like atmosphere of the day is suggested in Fig. 7. A huge welcome sign is out and Mrs Kuper together with the women and girls of the village pose for the visitors. This particular picture is a reflection of the war situation and bears evidence of the appreciation of the villagers for the military success of the American warriors. The successful warrior is highly valued in this area. Normally, it is almost impossible to persuade villagers to bring out their women and girls even for a photograph.

Fig. 3. The challenge team armed with the curved shield, known as *qauata* and made of hardwood, and spears. The shield on the right does not belong to this area but was collected earlier by Henry Kuper from another island.

Fig. 4. Brandishing their weapons the warriors rush down to the water's edge as though warding off the intruders.

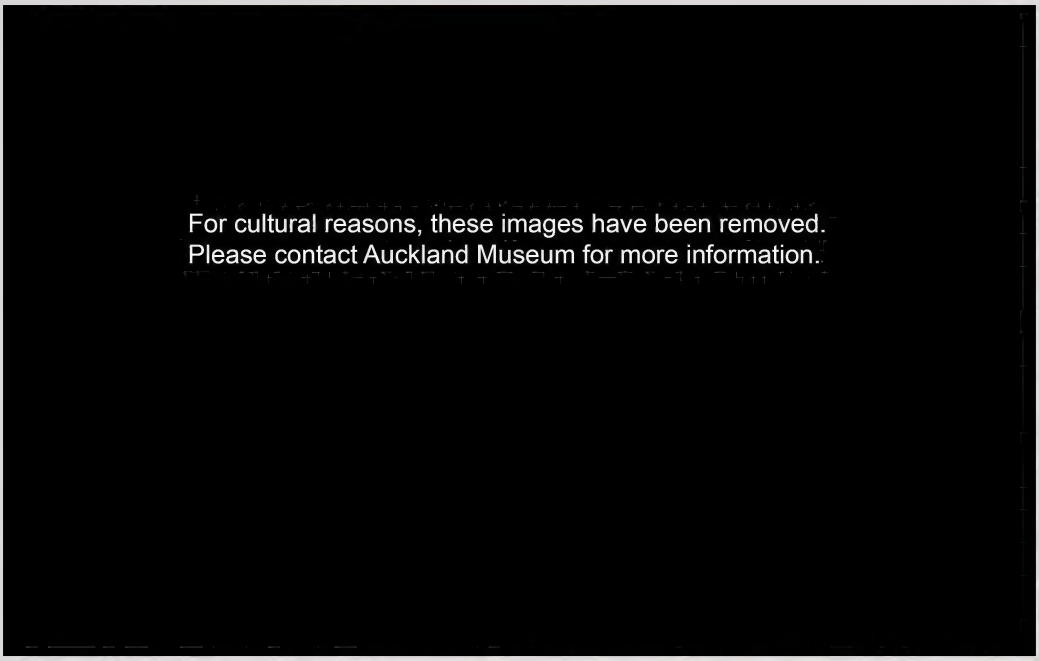
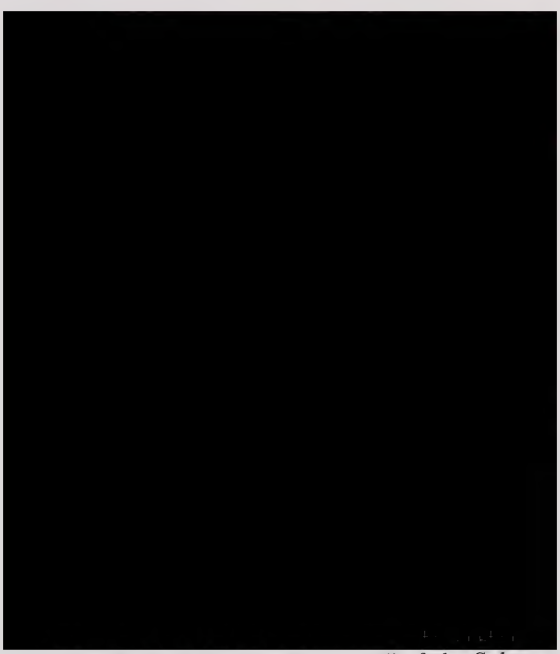
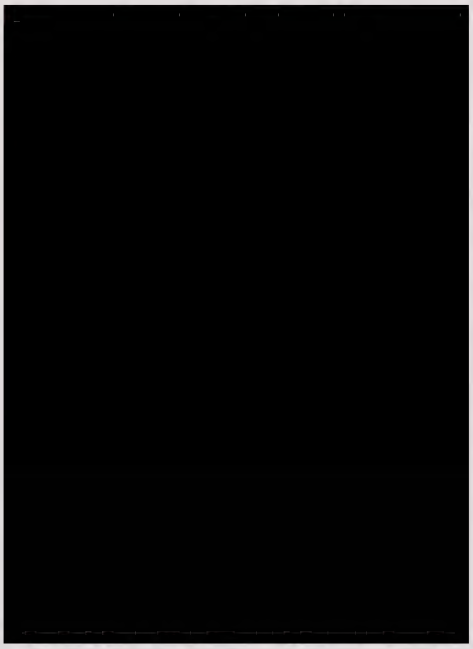


Fig. 5. The ceremonial challenge over, the warriors move into the water to help beach the ocean going canoe, known locally as *risu-e-rima,* and help the visitors ashore. In the background is a bonito fishing canoe, the *againiwaiau,* which are used to take initiates out on their first fishing expedition. Both canoes are plank-built.

Fig. 6. Once ashore the visitors are escorted by Mrs Kuper, or Kanana, and her daughter, Clara. An armed escort has been provided by the British Administration. The British Officer in the group was not identified.

Fig. 7. A welcome flag has been hung for the visitors. In front of the temporary shed are decorated houseposts, just visible above the heads of the girls. Kanana (Mrs Kuper) here poses with other women of the village and with the younger girls and boys many of them wearing shell-money ornaments.





Figs. 8, 9. 8. The "enslavement" of the Solomon Island people by the Japanese conquerors is dramatised in this picture for the benefit of the American visitors who freed them. An effigy of a Japanese soldier was carved out of wood and dressed for the occasion.
9. Another sculptured effigy of the enemy carved by local Santa Ana carvers.

Reminders of the war situation which prevailed in 1943 are shown in Fig. 8, which dramatises the native conception of what the Japanese did to their people, and in Fig. 9 which features an effigy of the enemy. In Santa Ana the effects of warfare were felt as many of the men served as labourers for the Americans in Guadalcanal. Geoffrey Kuper was one of the "coast watchers" of the Solomons and a war hero of the area.

Welcoming the Dancers of Ulawa

Almost forgotten in the excitement of welcoming the Americans was the arrival of the dancers from the island of Ulawa. The dancers were met on shore by Kanana (Mrs Kuper) and her young nephew, a *koukou* (sacred chief) and leader of the *maraufu* boys. It is customary to hand over red shell money, known as *faga,* to a visiting dance team, and the photograph (Fig. 10) shows Kanana doing this. The highest social position both in Santa Ana and Santa Catalina belongs to the *koukou,* who is the first born male or female in the Gafe (Crab) clan reckoned through the matriline or the oldest child in his particular generation. In 1943, Kanana's nephew was the youngest *koukou* on the island and the lost to be so designated. The cycle of ceremonies by which a koukou's status is socially validated was never completed and thus it is doubtful whether this *koukou,* now a middle-aged man, will ever assume the full role of a *koukou.* However, in 1943, the option was still open and the *koukou* was put into the centre of all important ceremonial transactions, as in Fig. 10.

Fig. 10. Kanana and her nephew, a young *koukou* and "leader" of the maraufu boys, approach the dancers of Ulawa to present the customary red shell money (*faga*) to a visiting dance team.

Fig. 11. The *qea*, or initiation stage, is blessed by Father Hill. This view of the *qea* shows that the stairways go up one side and down the other. Clearly visible, too, is the smaller *qea* on top of the larger one. Sculptured fish forms are more easily seen in this picture. The decorations below the platform are probably bright orange mangrove fruit.

The Completion of the Initiation Ceremony

Christianity was first introduced into Santa Ana in 1925 (Fox 1925 : 6). By 1943 it was firmly established at Gupuna but it was not until the next decade that the village of Natagera became predominantly Christian. Evidence of the firm hold Christianity had established in Gupuna is provided in Fig. 11 which shows Father Hill of the Melanesian Mission blessing the initiation platform before it is used by the initiates. The bonito cult with its associated complex of frigate birds and sharks was central to the religious system, the value system and to the technological and artistic system of Santa Ana. The participation of missionaries in the initiation ceremony indicates a high degree of erosion of the indigenous religious system and it is difficult to see how the inconsistencies and contradictions of the two systems could have been reconciled.

It is possible that participation of a missionary was "staged" for the benefit of the Christian Americans but I doubt whether this was the case. It is more likely that by 1943 most of the Gupuna villagers had become Christian and wanted double protection. This was a way of including the missionary and gaining the prestige and protective power of the Christian god.

However, when an intrusive ideology is included in an important native institution one suspects that something has happened to force an entry. I am suggesting that the economic base of the *maraufu* institution had been disturbed by the imposition of British law, a point which I shall elaborate later. By shaking its economic foundation the *maraufu* institution lost some of its value. A complementary cult, that of shark worship, particularly the Waumauma cult, was able to rise in importance thus challenging the supremacy of the bonito cult. The subsequent intrusion of the missionaries with yet another cult hastened the demise of the *maraufu* institution because there was a hope of a new prosperity based on the technology and cash resources of the white man, whom the missionaries represented.

It should also be mentioned that Santa Ana society is divided into two loosely organised moieties each with its grouping of matrilineal clans. Allied with the Atawa moiety are the Mwa (Snake), Mwaroa, and the now extinct Pagewa (Shark) clans. Allied with the Amwea moiety are the Gafe (Crab), Garofai (Turtle), Ariu (Trevalli), Kaura (Frigate Bird) and Apenawaru clans. Population strengths of the various clans in 1970 were as follows: Mwa 390, Gafe 326, Garofai 88, Ariu 184, Mwaroa 61, Apenawaru 76, Kaura 8, Pagewa nil. Thus, the total population of Santa Ana, when everyone is at home, is 1133. When I conducted a census in January, 1971, there were actually 745 persons in Santa Ana. This figure can be compared with 360 which was the population figure given by Henry Kuper for 1926 (Kuper 1926 : 5). The resident population has thus more than doubled and the total population more than tripled in 45 years. A great fear among the local population is that something would happen to bring everyone home. This would cause a major crisis because local agricultural resources can barely cope with the needs of the resident population of 700 which swells to 800 when the school children return for their holidays. Overpopulation is already a problem on this island of poor soil and limited economic resources.

I return now to the photographic record. The high point of the day's activities is about to begin. Fully costumed, as in Fig. 12, the initiates are lined up ready to ascend the platform. Each boy is dressed, as shown more clearly in Fig. 13, in shell money wrist bands *(ngaungau-ni-rima),* arm bands called *raquo,* a belt *(fogofogo),* ankle bands which are similar to the wristbands, a cowrie shell band below each knee and called a *qaqa,* bandoliers of six to eight strings of shell money worn across the breast

Fig. 12. The *maraufu* boys, numbering about twenty, are arranged into lines before approaching the platform.

and called *mamafe*, a necklace of 400 flying-fox teeth, called *roke*, around the neck, a headband of cowrie shells, called *taraipuri* over the forehead and a crescent-shaped pearl shell neck pendant called *tafi*. According to the wealth of the particular family a boy might also wear armrings of fossilized clam-shell called *gima*, a nose ornament known as *tamono-arafa*, and a comb decorated with streamers, on the head. Ideally, every boy should be carrying a small basket in which he will place his bonito fish hooks. However, whatever the circumstances of the parent each boy must carry an initiation shield called a *maramaraitapa* which is distinctive of this area.

There are regional differences in regard to what an initiate carries with him onto the platform. In Sa'a, he carries a paddle and the initiate is required to paddle as he walks up the platform. On the other hand, at Ulawa, the initiate must carry three spears decorated in red, one in the right hand and two in the left (Ivens 1927 : 142). At Santa Ana, the unique *maramaraitapa*, decorated characteristically in frigate bird designs is required. A selection of shields, decorated in various ways, is shown in Fig. 14. Modern non-functional shields are still being produced today for sale to art buyers and museums.

By about 1 p.m., the boys are ready to begin their ritualised procession up the platform stairways. I don't know how the boys were divided at Gupuna but when Geoffrey Kuper was initiated local boys went up one stairway and boys from other villages went up the other. The division could also be made in accordance with moiety membership because both moieties in Santa Ana participate in the initiation ceremony. Each moiety owns a custom house, one belonging to the Atawa moiety and the other to the Amwea moiety. It would be reasonable to infer that the two sets of stairways

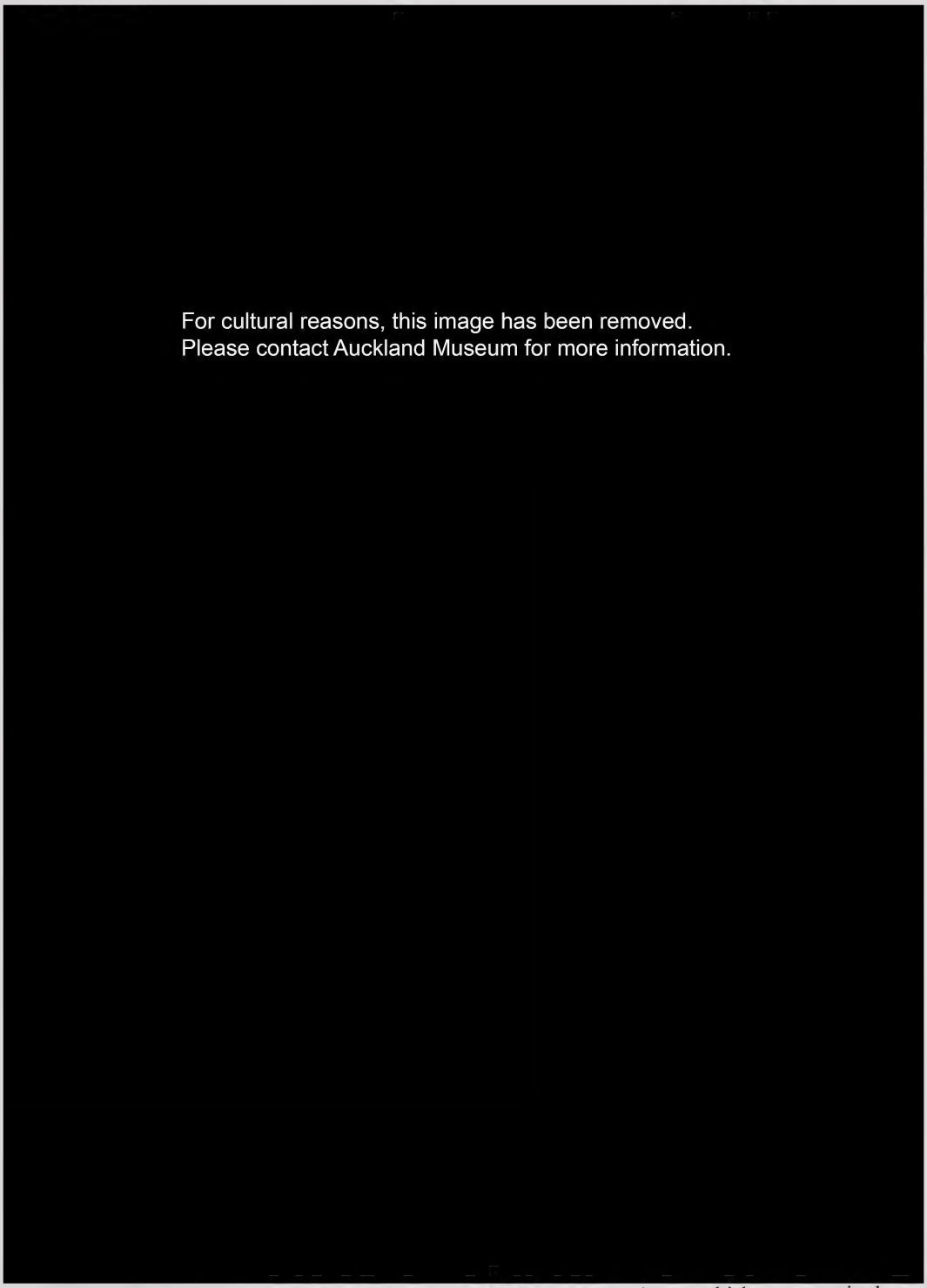


Fig. 13. This picture shows clearly the ceremonial costume items which are required for a *maraufu* boy. He holds his shield in the proper position.

Fig. 14. Of interest in this picture is evidence of the wide spread of ages of the boys, from late teens down to mere toddlers. Also of interest is the nose ornament *tamono-arafa* being worn by the tallest boy. This picture also depicts a variety of shield designs, all based on frigate bird motifs.

up and down the other side of the initiation platform is a reflection of the social division into two moieties. In order to avoid conflict each moiety must be represented in the platform.

The boys are lined up ready to proceed towards the appropriate stairway. Up on the platform, the priest begins to tap a rhythm on his bamboo lime container. The boys hum in time with the rhythm and they dance towards the stairway, the body turning from one side to the other (Fig. 15). They proceed up the stairs until all are standing around the platform. The *maramaraitapa* shield is carried across the chest. All eyes are upon the *maraufu* boys, who are now elevated and set off on a ritually powerful stage. The villagers must look up towards them and admire them.

By this time the spectators have milled around the *qea* eagerly waiting for what is to follow (Fig. 16). On a signal from the village chief the boys reach down to a prepared pile of gifts made up of sugar cane pieces, betel nut, *amasi* leaves to chew with betel nut, sticks of tobacco and possibly cigarettes and in this case army rations of non-lethal food items. These items are thrown down[1] to the crowd. There is a mad scramble for these gifts and this effectively relaxes the dramatic tension of the event.

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[1] Full ceremonial display of the initiates was a feature in Ulawa and Sa'a as well but the similarities end there. Ivens did not mention gift-giving from the platform as occurring in Ulawa but in Sa'a the boys ate a meal on the platform and threw down morsels for the spectators (Ivens 1927 : 142). The Santa Ana practice appears to be closely related to the Sa'a custom as in both places food is "distributed" from the platfform.

Fig. 15. Holding their shields to their chests the boys dance up the stairways in a side-ways gait. It will be noticed that the youngest initiates are being assisted by older persons. Santa Ana people are very fond of children and will not subject them wilfully to unnecessary cruelty.

Fig. 16. The initiates have all been received onto the platform by the priest and the village chief with his hand raised is about to give the signal for the throwing of gifts by the *marautu* boys to the crowd below.

Fig. 17. The gift scramble over the boys come down from the platform and they are entertained by the adults with pantomimes and dancing. It is not known by the author what event is being dramatised in this picture.

Up until this moment all *maraufu* activities have been carried out quietly and very seriously. The scramble provides a much needed release from tension for the *maraufu* boys. The obvious psychological release apart, the gift scramble probably represents a way of thanking the spectators for their participation in the activities. It could also be viewed as a ceremonial payment to the public by the *maraufu* boys, for recognising their change in status from childhood to adulthood.

The changed status of the *maraufu* boys is made apparent when they eventually come down from the platform. They sit together on the ground and they are entertained by the adults. Dramatic dances are performed, as in Fig. 17, and male dance teams put on a dance show for their benefit. The photographic record does not, however, include group dancing by men and it must be assumed that this was replaced by female dancing as shown in Fig. 18. The importance of the entire ceremony is reflected in the fact that dance teams featured here came from Ulawa, near Malaita. By now it should be about 4 p.m. and the preliminary dancing should be over.

A cleared grassy area is next covered with coconut leaves and huge wooden bowls of *susugu* pudding made from pounded *taro* are laid out. For the American visitors a temporary feast house was erected and tables built, as shown in Fig. 19. In addition to *susugu* pudding, a highly favoured ceremonial dish in this area, there are roasted yams, fish and roast pork. The newly initiated men sit together to eat but everyone else participates in the grand feast thus emphasizing the unity of the villagers.

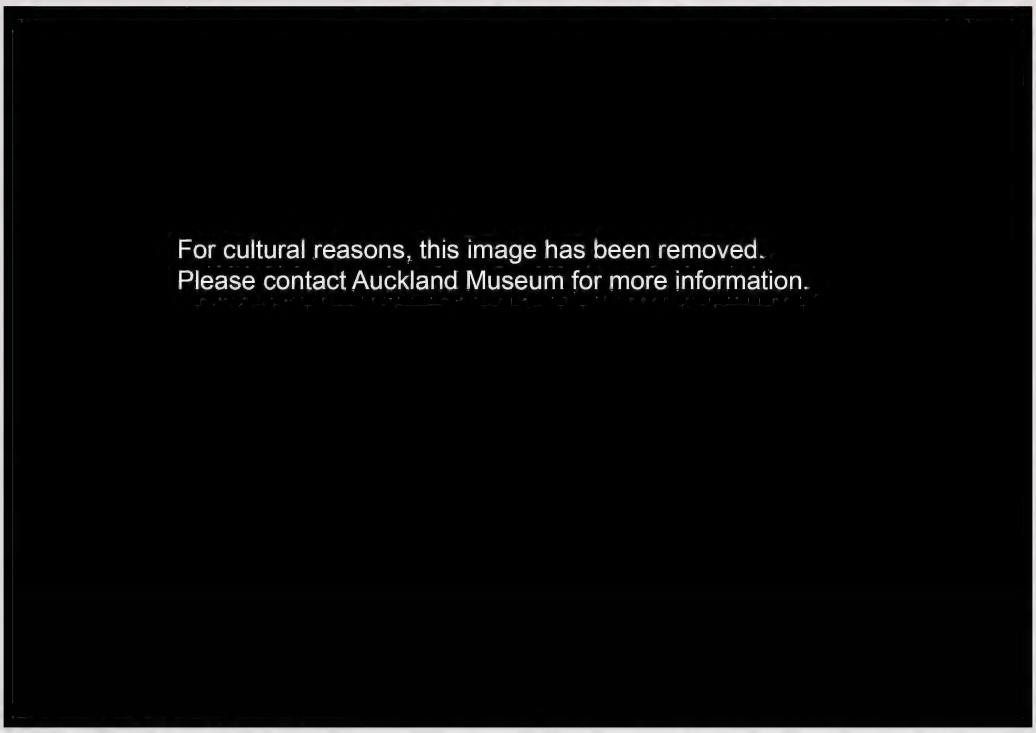

Fig. 18. It is evidently late afternoon as the shadows are long and the women from Ulawa are performing one of their bonito fishing dances. Major Moore suggested that the dance was being performed for the man who stands in the middle of the group in commemoration of his wife who had died a year earlier. It is more likely, however, as Kuper suggests, that he is a priest who is protecting the dancers by warding off evil spirits. The dancers do not take part in the chant but concentrate on the dance actions.

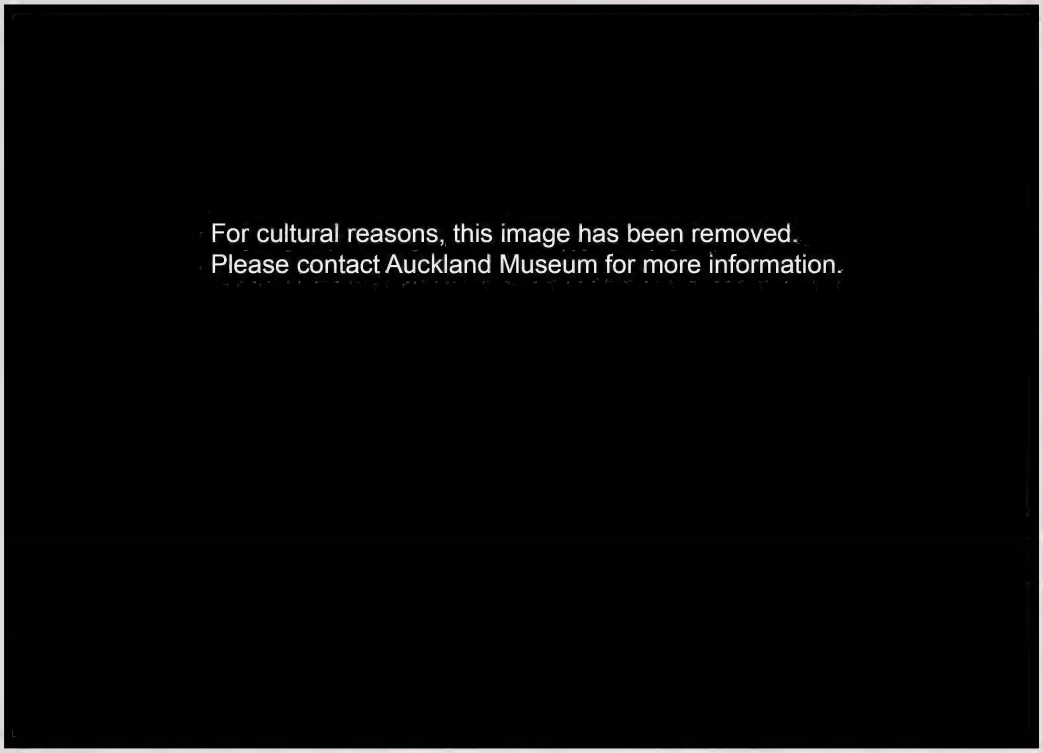

Fig. 19. From right Commander Wilson, General Howard and Colonel Widdy have been presented with native food served in ceremonial bowls. Decorated with inlaid nautilus shell and painted black with charcoal and the juice of a tree root these bowls were used by adherents of various clan gods when making sacrifices to them. The bowls of 1943 show evidence of more restraint in their decoration than is evident in the bowls produced now.

As a mark of honour, Commander Wilson, General Howard and Major Widdy were presented with small carved and inlaid bowls *(apira)* of food (Fig. 19). Such bowls were traditionally used by pagans when eating sacrificial food to their pagan deities[1]. The conflict of ideologies here takes secondary place to the high ritual and artistic value placed upon such bowls. Ordinary food bowls would have been deemed inappropriate for the occasion. Of ethnological interest is the fact that the three bowls shown in the photograph are relatively plain and sparsely decorated with inlaid nautilus shell when compared with bowls which are being produced now. A likely reason for the blossoming of decorations is that the bowls are no longer functional (Mead 1973b).

When the feast is over the area is cleared away and dancing recommences and goes well into the night. Some of the evening performances are shown in Figs. 20 and 21. When the evening dances conclude the newly initiated men are free to rejoin their families. Their initiation is complete.

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[1] Great numbers of these bowls are produced each year. I presented two such bowls to the Auckland Museum. Earlier, William Davenport collected a large quantity of them for the University Museum at Pennsylvania. Many of these bowls are featured in his 1971 article.

Fig. 20. The two women on the left are blowing a dance rhythm through large sea-shells while the children dance. This is one of the dancing items of the evening entertainment.

Fig. 21. A dance by older girls of the village. Kanana's daughter, Clara, is on extreme right.

While it is true that many innovations were introduced to accommodate the visitors much of the activities followed traditional custom. For example, Fig. 22 records the fact that all services had to be acknowledged and paid for. Mrs Kuper, as Gafe hostess, is shown rewarding a woman for her participation in the dancing. The woman to the left is dressed in the traditional Santa Ana costume which is designed in such a way as to reveal tattooed decorations of the woman to maximum advantage. The photograph is of high ethnological value not only because it shows a true Santa Ana skirt but also because it shows extensive tattooing to a degree which cannot be seen today. The fully tattooed woman has disappeared from the Eastern Solomons. By fully tattooed I mean that a woman is decorated with the full complement of frontal and back tattoo as illustrated by Kuper (1926, Figs. 5, 6). In 1926, according to Kuper (1926 : 3) there were only six fully tattooed women in Santa Ana and Santa Catalina. The woman shown in Fig. 22 appears to lack only the tattoo pattern on her back. Her thighs and buttocks are tattooed. Although there are still tattooed women in evidence on both islands most have only the frontal pattern from the breast down to the pubic area.

Apparently, the American visitors remained for all of the ceremony and for the evening entertainment. The Service Command photographs thus provide a sampling of the activities associated with Gupuna's last initiation ceremony from the moment of their arrival until late into the evening.

In the Annual Report for the Eastern Solomons District, 1938, Waddell recorded that Ulawa was visited and the final stages of an initiation ceremony were witnessed there. It was thought at the time that no further initiation ceremonies would be held in Ulawa. As described by Waddell the Ulawa ceremony is similar in all essential details to the Santa Ana ceremony described here. One difference noted by Waddell was that in Ulawa a triangular shaped platform was used, its apex end decorated like the prow of a canoe. Apart from this difference Waddell was of the opinion that the initiation ceremony of Ulawa was derived from Santa Ana.

Conclusions

The photographs presented here are important ethnological documents because they capture an historical moment that will never be repeated in Gupuna. At some time in the future some aspects of the *maraufu* ceremony may be revived but the equipment used will not be the same as used in Gupuna. Nor will the participants act in the same way because by then they will be more acculturated than the Gupunu people were in 1943. Many of the people shown in the photographs have either aged considerably or are dead. Mr Henry Kuper, shown on top of the initiation platform in Fig. 2, died some years ago. Of German extraction he married Kanana, of the Gafe clan, and settled in Santa Ana just before World War I[1]. Until the missionaries entered the area in the 1920s he was the only white man in the area. His wife Kanana, who is featured in many of the photographs, remained a native, lived native style, and played an important role in native affairs. With the active encouragement of her husband, who

[1] Bernatzik (1935: 7-13) devoted a chapter of his book to Henry or Heinrich Kueper, who came originally from Hamburg.

Fig. 22. Kanana (Mrs Kuper), on right, is paying the other woman with cigarettes for participating in the dancing. Important in the photo is the traditional Santa Ana skirt worn by the older woman. Since conversion to Christianity this garment is no longer worn. Also important is the extent of body tattooing evident at this time. The woman has a full complement of tattooing patterns which feature mainly frigate bird motifs.

in view of his published articles on native customs could be classed as an amateur ethnographer, she tried to keep native custom alive. There seems little doubt that there would not have been an initiation ceremony at Gupuna had she not undertaken to sponsor it at great cost to her family. As mentioned earlier, she too, has passed on.

The fortunate presence of the Americans at this closing ceremony combined with the passion of western civilisation for photographing exotica, conspired to preserve a record of inestimable value to ethnology. Of particular importance are the visual documentations of material objects formerly recorded inadequately in words only. Verbal descriptions of the initiation platform can never do justice to the remarkable edifice built by the Santa Ana people.

Of more general interest, however, are evidences of change in the bonito initiation ceremony and of the entire indigenous religious system. The participation of a missionary in the Gupuna ceremony indicates the degree to which the cult was losing its integrity. I would hypothesize that previously there was a balance between the positive force of the bonito cult and its negative opposition, the shark cult. The bonito cult was

positive because it motivated creative activities such as obtaining food for survival and providing artists with themes and motifs for their decorative art. All of the dominant material items of the culture such as the custom house, the memorial bonito canoe, known as *parufuraikao,* the bonito fishisng canoe or *againiwaiau,* the initiation platform and the initiation shield relate to the bonito cult. Throughout the culture there is evidence of the pervasive influence of the bonito cult thereby suggesting its centrality to the entire cultural and religious system. By contrast the shark cult[1] provided the mainspring for a very limited range of important artifacts. Chief among these are the shark casket or *iri* and the ceremonial bowls both large and small. Even in these artifacts, however, bonito themes and motifs are to be found.

I am proposing that in the indigenous culture the lifegiving positive force of the bonito was dominant in the religious system and was largely responsible for the development of the local culture. Its opposition, the shark cult, represented a negative force and death was its main concern. In theory the death dealing power of the shark deities was directed against outsiders. Within the social system the shark deities functioned as protective gods and in this sense complemented and reinforced the power of the bonito deities.

The complementary relation between these two forces could be upset, however. By 1943 the bonito cult had already lost considerable ground, thus removing important checks against the power of the shark deities. By far the most important influence for change came much earlier in 1893 with the imposition of British law. Santa Ana warriors could no longer raid the mainland to capture slaves to sell at Haununu although they tried to maintain the custom for as long as they could. The last capture involved a lad, called Adam, shortly after World War I. Some idea of the importance of capturing children and adults as a source of wealth to Santa Ana can be gained by considering the payment given by a Haununu chief for Adam whom he adopted to take the place of his deceased son. The raiders received 10 *faga* (about $240 today), 30 *sao* or white shell money ($180) and 10 *mamafe* (say $100), thus a total of $520 in Australian currency. With such wealth the raiders were able to buy large quantities of food to supplement the meagre resources of the island.

The victims of raids were either sold into adoption, as in Adam's case, or they were sold as slaves to the producers of shell-money at Haununu. Originally, Haununu was the production centre of red and white shell-money for a large portion of the Eastern Solomons which, of course, included the small islands of Santa Ana and Santa Catalina. Enforced cessation of slave capture threatened the shell-money industry by removing an important source of labour. Finally, it collapsed completely. At the same time it automatically cut off an important source of wealth to the island populations of Santa Ana and Santa Catalina thus upsetting the survival pattern and life-style which they had established. The people of Santa Ana no longer had the means of accumulating ceremonial surpluses in *taro,* yams and pigs. This in turn affected the bonito initiation ceremony as well as other ceremonies which all required ceremonial wealth.

The Gupuna initiation ceremony of 1943 provides evidence that the villagers tried their best to maintain this very important ceremony. However, with the economic resources of the community severely curtailed and not replaced by a satisfactory cash

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[1] The folklore associated with the shark deities, Karemanua and Waumauma, are given in Mead 1972b.

economy they simply could not continue the custom. There does come a point especially in an overpopulated island of meagre resources when considerations of biological survival take precedence over all other cultural matters. This point came in Gupuna after 1943 when no further *maraufu* ceremonies were held. It came in Natagera after 1956 and much later in Santa Catalina. During the 1960s William Davenport witnessed the last initiation ceremony held in Santa Catalina. The severe cyclone of 1971 which wrecked the houses and removed the vegetation cover of both islands makes it highly unlikely that another *maraufu* ceremony will be held in this area in the near future. A natural disaster has further impoverished the population of the two islands and forced them further towards a type of economy which is geared towards biological survival first and foremost.

Thus, the initiation ceremony died out in Santa Ana as a result of a combination of pressures. Erosion of its economic base through the prevention of slave capture had the most powerful effect. The inability to stage initiation ceremonies with confidence gave the complementary shark cult of Waumauma a chance to gain some supremacy in the value system. This was potentially a highly dangerous stage in religious change because the collapse of shell-money production at Haununu removed the heart of the overseas trading system so that overseas trading virtually ceased except for purchase of food from the mainland.

In such a situation the danger existed that the power of the shark deities would be directed inwards rather than outwards. More than likely this is what, in fact, happened and resulted in the extermination of the Pagewa clan in Santa Ana (Mead 1973a).

When Christian ideology and practice was introduced as an alternative in the 1920s the Gupuna people, followed later by other villagers, adopted it. Quite recently Christianity became the main religion at Santa Ana thus eclipsing the power of the bonito and shark deities.

Although I may have given the impression that the people of Santa Ana were presented with choices of action in regard to religious change, the evidence points to the fact that they had no choice at all. An assumption of the colonial experience is that respectably emancipated natives must have the same religion as their colonial masters. Thus in the long run indigenous native institutions, such as the *maraufu* ceremony, must be overcome and replaced. When Church and Government work together as they have done and are doing at present in the Protectorate, the *maraufu* ceremony has little chance of survival as a functional custom.

Acknowledgements. A few copies of the photographs presented here were in the possession of Mr Geoffrey Kuper who had them from his father, Henry Kuper. The photographs were badly faded and eaten by silver fish. These remnants impressed upon me their ethnographic importance and it was a matter of good fortune that a full set had long ago been presented to the Auckland Institute and Museum. The attribution of the photographs to the American Armed Services is based on the fact that Kuper's photographs were stamped with the following identification: "Service Command Photo Lab. 709."

To Mr Geoffrey Kuper, who not only permitted me free use of his notes on the initiation ceremony in Santa Ana but who also provided additional information relevant to this paper, I extend my most grateful thanks. He was my host and chief interpreter of Santa Ana customs. But for him my task would have been more difficult.

Identifications of officers are as supplied by Major Merrill Moore in his notes, except for some corrections given by Mr Geoffrey Kuper, who knew some of them personally.

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THE ACAENA OVINA (ROSACEAE) COMPLEX IN NEW ZEALAND

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Abstract. Representatives of the *Acaena ovina* complex in New Zealand are described and illustrated. Only 2 species (*A. agnipila* and *A. echinata)* and 4 varieties of the Australian complex have so far been collected in New Zealand; *A. ovina* s. str. has not yet been recorded. The status of the hybrid species *A.* × *anserovina* in Australia and New Zealand is discussed.

The Southern Hemisphere genus *Acaena* consists of about 150 species, the majority confined to South America, with others extending to most of the sub-Antarctic islands, Australia, New Zealand and South Africa. The most recent monograph of the genus as a whole is that of Bitter (1911), in which two subgenera ('Reihen'), *Axillares* and *Terminales,* were recognised, defined by the position of the inflorescence.

All of the New Zealand species, and all of the Australian species except the Tasmanian *A. montana ('A. tasmanica')* were included by Bitter in his subgenus *Terminales* which was further divided into four sections. The *A. ovina* group fell into section Euacaena, while the other Australian and New Zealand species were distributed amongst the sections Ancistrum, Pteracaena and Microphylleae (see Allan (1961) for summary). A total of three species was recognised for Australia, and eight for New Zealand. Allan (1961) adopted a narrower concept for the New Zealand species and raised their number to fourteen, although the circumscriptions of the taxa were basically unchanged from Bitter's views. There has been no corresponding re-examination of the Australian species *in toto.*

However, the *A. ovina* group, native to southern and eastern Australia, was more recently revised by Orchard (1969) and shown to consist of two species, one eastern and one western, which hybridized at their region of overlap in southern New South Wales. The resultant hybrid swarm formed the basis of Allan Cunningham's description of *A. ovina* (Cunningham, 1825). It was also shown that members of the group formed sterile hybrids with *A. anserinifolia* at the many points of overlap with that species. Members of the *A. ovina* complex were accidentally introduced into New Zealand in the second half of the 19th century, and soon spread along roadsides and through pastures in many places. It is the purpose of this paper to correlate these adventives with their Australian progenitors.

The first reference to *A. ovina* in New Zealand is apparently that of Buchanan (1871). In a paper read to the New Zealand Institute on 25th June 1870, he reported the occurrence of apparent hybrids between this species and *"A. sanguisorbae"* on Mount Victoria, Wellington. From his comments it appears that *A. ovina* s. 1, was at that time already well established near Wellington. Guthrie - Smith (1953) stated that *A. ovina* was brought to Tutira station (Hawkes Bay) sometime in the 1870's in the wool of merino sheep, and by the 1880's it was well established near wool sheds and

in open pastures. G. M. Thomson collected specimens of *A. agnipila* from Allan's Ranges, Otago in 1874. By 1897 the Department of Agriculture could report that the plants were "rapidly becoming a source of great annoyance to wool-raisers".

Although three species (12 varieties) are involved in the complex in Australia, only two species (four varieties) have been introduced into New Zealand, and one of the species *(A. echinata)* is known from only a single collection, made in Dashwood Pass, Marlborough in 1942. All other New Zealand collections are *A. agnipila,* of which three varieties occur here. The most common is *A. agnipila* var. *aequispina,* which extends from near Dunedin to Auckland. *A. agnipila* var. *protenta* has a range almost as extensive, but is less common. *A. agnipila* var. *tenuispica* is common on the Canterbury Plain, but otherwise is known only from two collections from near Wellington. *A ovina* s. str. has not as yet been found in New Zealand.

Plants of the *A. ovina* group are easily distinguished from the native New Zealand species by the shape of their inflorescences. The introduced species have the flowers more or less evenly distributed along the upper ⅓ to ½ of the rachis, while in the native species the flowers are grouped in a globular head at the tip of the rachis. *A.* × *anserovina* (see later) has an inflorescence intermediate between these two groups.

In the descriptions that follow, only the major references are cited. For a more extensive bibliography see Orchard (1969).

KEY TO THE *A. ovina* COMPLEX IN NEW ZEALAND

1. Spines of fruit very unequal, the larger ones with thickened conical bases; plant ± glabrous, with a few appressed hairs ..... **A. echinata** var. **echinata**

1. Spines of fruit ± equal, all lacking thickened conical bases; plants pilose, with ± dense spreading hairs 2

2. Fruit densely pilose ..... **A. agnipila** var. **tenuispica**

2. Fruit glabrous 3

3. Stamens 3 - 4 (—5), length 1.5 - 2.0mm; stipules 2.0 - 3.5mm long; inflorescence never branched ..... **A. agnipila** var. **aequispina**

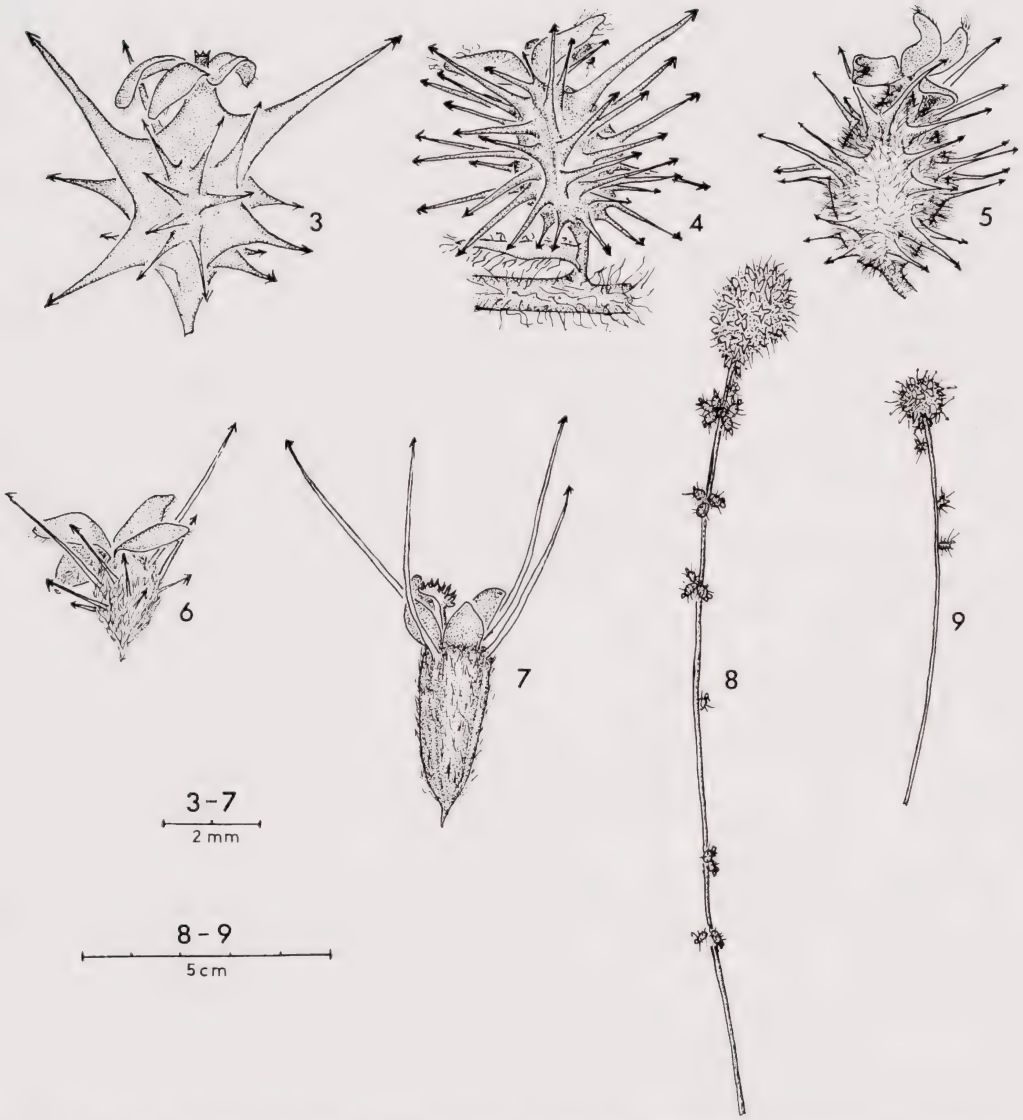
3. Stamens (5—) 6 (—7), length 4.0mm; stipules 4.0 - 5.0mm long; inflorescence branched, or at least with fascicles of flowers in axils of upper leaves **A. agnipila** var. **protenta**

Acaena echinata Nees in Lehm., Pl. Preiss. 1(1844)95.

var. **echinata** (Fig. 3)

Herbaceous perennial (7-)25 -35(-50)cm tall, stems erect or ascending, glabrous of sparsely appressed pilose. Leaves narrowly obovate to oblanceolate (4 -)7 - 12(- 20) cm long, imparipinnate, petiolate, stipulate; petiole and rachis appressed pilose with hairs as for stems; stipules deltoid or linear, 1.5 - 2.5(-5.0)mm long, 1.0 - 1.5(- 2.0)mm wide, glabrous adaxially, appressed pilose abaxially; leaflets (9-)13 - 15(- 19) per leaf, ovate to oblong, (5 -)7- 10(15)mm long, (4-)5- 8(- 10)mm wide, serrate with 8 - 13 blunt teeth ½ - ⅔ of lamina width (rarely cut almost to midrib), glabrous or very sparsely pilose on upper surface, hairs on lower surface confined to veins and/or midrib.

Figs. 1,2. 1. Habit of *Acaena agnipila* var. *aequispina* (H. H. Allan s.n., CHR 178). 2. Habit of *Acaena agnipila* var. *protenta* (H. H. Allan s.n., CHR 18354A).



Figs. 3-9. 3. Reconstruction of the fruit of *Acaena echinata* var. *echinata* (A. J. Healy s.n., CHR 227584). 4. Fruit of *A. agnipila* var. *protenta* (P. Hynes s.n., AK 51589). 5. Fruit of *A. agnipila* var. *tenuispica* (E. M. Chapman s.n., CHR 219737). 6. Fruit of *A.* × *anserovina* (H. H. Allan s.n., CHR 261). 7. Fruit of *A. anserinifolia* (H. H. Allan s.n., CHR 269a). 8, 9. Inflorescences of *A.* × *anserovina* (8. P. Hynes s.n., AK 104874, 9. H. H. Allan s.n., CHR 178.).

■ A. echinata var. echinata
● A. agnipila var. aequispina
○ A. agnipila var. protenta
x A. agnipila var. tenuispica
+ A. X anserovina
100 km

Fig. 10. Distribution of *Acaena agnipila, A. echinata, and A.* × *anserovina* in New Zealand.

Inflorescence a cylindrical, unbranched spike, becoming interrupted in fruit. Sepals 5, green, ovate, 1.0 - 1.5(- 2.5)mm long, 0.7 - 1.0mm wide, ± glabrous or sparsely pilose on outer surface. Stamens (2 -)4 - 5, deep red-purple, 1.0 - 2.0(- 3.0)mm long. Style solitary, 1.0 - 1.5mm long.

Fruit ovoid, with 2 - 3 prominent longitudinal ridges formed by fusion of bases of larger spines, 2.5mm long, 1.5mm wide (excluding spines), glabrous; spines unequal, barbed at tip, glabrous, 3 -6(- 8) longer than others, 2.0 - 2.5(-4.0)mm long, with thickened conical bases, (8 -)20 - 30 shorter ones, usually slender, 1.0 - 2.0mm long; 1 seed.

DISTRIBUTION. In Australia, known from south-eastern New South Wales, central and eastern Victoria and southern South Australia. In New Zealand, so far only reported from one locality in Marlborough (Fig. 10).

Specimens examined. South Island: Healy s.n., 11.v.1942, Dashwood Pass Marlborough, CHR 227584 p.p. (fl.,fr.).

This species is readily distinguished from *A. agnipila* by its relatively hairless appearance, the few hairs on the stems and leaves being closely appressed, and by the prominent angles formed on the fruit by fusion of the thickened bases of the 6 - 8 larger spines. *A. echinata* also tends to have fewer leaflets per leaf and fewer serrations per leaflet than does *A. agnipila,* but because of a considerable overlap in the ranges of variation of these characters, they are unreliable for isolated determinations.

The specimen cited above is a single plant occurring in a collection otherwise consisting of abnormal forms of *A. agnipila* var. *aequispina.* It is possible that some introgression may have taken place, although none of the plants can be referred with certainty to *A. ovina* s. str.

Acaena agnipila Gandoger, Bull. Soc. Bot. France 59(1912)706.

Herbaceous perennial 20 - 50(- 66)cm tall, stems erect or ascending, ± densely pilose with spreading hairs. Leaves narrowly obovate to oblanceolate, (3.5 -)8 - 15 (- 22)cm long, petiolate, stipulate, imparipinnate, petiole and rachis pilose, with spreading hairs as for stems; stipules deltoid to linear, (1.0 -)2.0 - 5.0(- 8.0)mm long, 1.0 - 3.0 mm wide, glabrous or sparsely appressed pilose adaxially, more densely pubescent abaxially. Leaflets (9 -)17 - 23(- 27) per leaf, ± sessile (except terminal one), ovate to oblong, (5 -)8 -15(- 26)mm long, (3-)6 - 9(- 13)mm wide, serrate with (9 -)12 - 15 (- 18) blunt teeth ½ - ¾ of lamina width, moderately appressed pilose on upper surface, densely appressed pilose over entire lower surface.

Inflorescence a cylindrical, branched or unbranched spike, becoming interrupted in fruit. Sepals 5, green, ovate, 1.5 - 2.5mm long, (0.5 -)1.0 - 2.0mm wide, sparsely to densely pilose on outer surface. Stamens 3 - 7, 1.0 - 4.0mm long. Styles 1(- 2), 1.0 - 2.0mm long. Fruit ovoid, 2.0 - 2.3mm long, 1.2 - 1.5mm wide (excluding spines), glabrous or pubescent, with (15 -)30 - 40(- 55) spines, all ± equal, slender, 1.0 - 2.0(- 3.0) mm long, glabrous, barbed at tip. Seeds 1(- 2) per fruit.

var. **aequispina** Orchard, Trans. R. Soc. S. Aust. 93(1969)96 - 97 (Fig. 1)

Acaena ovina subsp. *nanella* Bitter, Bibl. Bot. 74(1911)71. [Typus : "Novae Zelandiae insula meridionalis: Canterbury Plains, old river-bed of Waimakariri, 'Not native of New Zealand?' leg. L. Cockayne, herb. Berol." Holotypus: probably destroyed. Isotypus: L. Cockayne s.n., -.ix.1890, Old river bed of Waimakariri, Canterbury Plain, near Styx, CHR 45341 (fl.)!]

Perennial herb (15 -)20 - 35(- 60)cm tall, leaves (5 -)8 - 12(- 22)cm long, stipules linear to deltoid, rarely slightly bifid at tip, (1.0 -)2.0 - 3.5(-5.0)mm long, (0.5 -)1.0 - 2.0mm wide, glabrous or sparsely pilose adaxially, more densely appressed pilose abaxially. Leaflets (9 -)17 - 21(- 25) per leaf, ovate to oblong, (5 -)8 - 14(- 26)mm long, (3 -)6 - 8(- 13)mm wide, with (9 -)12 - 14(- 16) serrations $\frac{1}{2}$ - $\frac{2}{3}$ of lamina width. Inflorescence an elongate, interrupted, unbranched spike. Sepals 5, 1.0 - 2.0mm long, 0.6 - 1.0(- 1.5)mm wide, sparsely pilose; stamens 4 - 5, (1.0 -)1.5 - 2.0(- 3.0)mm long; style 1, 1.0 - 1.5mm long. Fruit ovoid, glabrous, with (12 -)30 - 40(- 55) equal, slender, glabrous spines, 1.0 - 2.0mm long.

DISTRIBUTION. In Australia, occurring in south-eastern Queensland, eastern New South Wales, Victoria, Tasmania and south-eastern South Australia. In New Zealand this variety is found from Dunedin to Auckland, and one collection (Matthews s.n., AK 75064) is doubtfully recorded from near Awanui (Fig. 10).

Specimens examined. North Island: Allan s.n., Parewanui, Waitatapia, near Bulls, CHR 3104 p.p. (fl.); Allan s.n., 16.xi.1928, Tauherenikau River, CHR 178 p.p. (fr.); Carse s.n., 15.x.1928, Penrose, Auckland Isthmus, CHR 5435 (fl.); Connor s.n., 8.xi.1944, Wharepaina, near Taupo, CHR 51577 (fl.), Cook s.n., 16.xi.1952, near Cape Turakirae, CHR 80601 (fr.); Cooper s.n., -.xii.1956, Desert Rd, AK 50452 (fr.); Cranwell s.n., 1931, Taupo, AK 75063 (fr.); Davey s.n., 12.x.1938, Seatoun, CHR 20077 (fl.); Healy s.n., 25.xi.1941, Seatoun, CHR 226295, 226296 (fl.,fr.); Hodgkins s.n., Mt. Wellington, CHR 2043 (fl.,fr.); Kirk s.n., Wellington, AK 75059, CHR 226299, OTA 016469 p.p. (fl.,fr.); Macmillan 70/232, 14.xi.1970, Gladstone, CHR (fl.,fr.); Matthews s.n.,? Oinu, AK 75064 (fl.); Mason s.n., 23.x.1939, Lower Hutt, 22958 (fl.); Molesworth s.n., 4.i.1940, Gorge near Mohaka, AK 33771 (fr.); Parris & Croxall s.n., 21.x.1970, near Taupo, AK 127702 (fr.); Woodhead s.n., 29.xi.1934, Bainesse, Foxton Line, CHR 45342 (fl.,fr.). South Island: Anon. s.n., East Taieri, WELTU 10324 (fl.); Allan s.n., 22.x.1941, Hurunui, CHR 48519, 58659 (fl.); Ashwin s.n., 11.xi.1957, Crail Bay, Pelorus Sounds, CHR 152446 (fr.); Brownlie 986, 25.i.1970, Lindis Pass, CANU (fr.); Calder s.n., 1932, Lake Wakatipu, LINCOLN (fr.); Cockayne s.n., - ix.1890, old river bed of Waimakariri, CHR 45341 (fl.); Collett s.n., 29.xii. 1968, Balmoral State Forest, CHR 186598 (fr.); Dobson s.n., 14.v.1971, Ellesmere Spit, CANU 15085 (fr.); Healy s.n., 11.v.1942, Dashwood Pass, CHR 227584 p.p. (fr.); Healy 70/131, 12.xi.1970, Lowburn, Clutha River, CHR (fl.fr.); Healy 70/134, 12xi.1970, Glendhu Bay, L. Wanaka, CHR (fl.); Healy 70/147, 24.xi.1970, Meadowbank Station, Taylor R., Blenheim, CHR (fr.); Healy 70/167, 26.xi.1970, Hitchen Hills Station, Hurunui R., CHR (fr.); Kirk s.n., Te Aro, LINCOLN, MEL (fl.); Macmillan s.n., 27.iii.1955, Waimakariri River, CHR 149459 (fr.); Macmillan s.n., 30.iii.1963, Old Man Ra., Balmoral Station, CHR 155486 (fr.); Macmillan s.n., 14.xi.1967, Glynnwye Stream, Hope Valley, CHR 190434 (fl.); Macmillan 68/326, 29.xii.1968, S. side of Rakaia Valley opp. Peak Hill, CHR (fl.,fr.); Mark s.n., 12.i.1965, Mt. Iron, Lake Wanaka, OTA 012964 (fr.); Melville & Melville 5713, 23.xii, 1961, Kaitorete spit, CHR (fl.,fr.); Mitchell s.n., 6.iii.1970, Pukaki township, CHR 211519 (fr.); Molloy s.n., 3.ii.1970, Bankside Reserve, CHR 212254 (fl.,fr.); Moore s.n., 5.iii.1953, Lower Acheron, CHR 180175 (fr.); Thomson s.n., -.i.1874, Allan's Ranges, Otago, CHR 183860 (fl.).

The type of *A. ovina* var. *nanella* was not examined for the treatment of the Australian species (Orchard 1969), but the taxon was considered, on the basis of Bitter's description, to be taxonomically synonymous with *A. agnipila*. A duplicate of Cockayne's collection, housed in CHR, has now been examined and found to be *A. agnipila* var. *aequispina*.

A. agnipila var. *aequispina* is distinguished from var. *protenta* by its unbranched inflorescence, fewer stamens and generally less robust appearance, and from var. *tenuispica* by its glabrous fruits. The fruits of var. *aequispina* and var *protenta* are very similar.

var. **protenta** Orchard, Trans. R. Soc. S. Aust. 93(1969)97 (Figs. 2, 4)

Perennial herb 20 - 40cm tall, leaves (7 -)10 - 20 cm long, stipules linear to deltoid, 4.0 - 5.0mm long, 2.0 - 3.0mm wide, glabrous adaxially, appressed pilose abax-

ially. Leaflets 18 - 23 per leaf, 10 - 17mm long, 7 - 10mm wide, with 10 - 13 serrations ½ - ¾ of lamina width, sparsely pilose on upper surface, moderately densely pilose on lower surface. Inflorescence an elongate, interrupted spike, either branched near the base or bearing large fascicles of flowers in axils of upper leaves. Sepals 5, 1.5 - 2.0mm long, 0.7 - 1.0mm wide, sparsely pilose; stamens (5 -)6(- 7), 4mm long; style 1 (rarely 2), 0.9 - 1.5mm long. Fruit ovoid, glabrous, with 25 - 35 equal, slender spines, 1.0 - 2.0mm long.

DISTRIBUTION. In Australia, known from scattered localities in Queensland, New South Wales, Victoria and South Australia. In New Zealand, *A. agnipila* var. *protenta* is found almost throughout the range of the species, from Dunedin to Hamilton, but is most common in the North Island. (Fig. 10).

Specimens examined. North Island : Allan s.n., 21.xi.1928, Rotorua, CHR 431 (fl.); Allan s.n., 1.i.1937, Parewanui, Rangitikei River, CHR 18354A (fl.,fr.); Clark s.n., Waipara Stn., Whatatutu, CHR 5426 (fr.); Healy 119, 17.x.1933, Railway bridge, Aorangi, CHR (fl.); Hodgkins s.n., -.iii.1941, Tauranga, CHR 226294, 226298, 227597 (fr.); Hynes s.n., 21.xi. 1959, Panui Flats, Mayor Island, AK 51589 (fr.); Mackintosh s.n., -.i.1949, Horotiu, Waikato River, CHR 64648 (fr.); Mason s.n., -.ii.1934, Putaruru CHR 226297 (fr.). South Island: Cheeseman s.n., Awatere, AK 75060 (fr.); Haughton s.n., 20.xii.1965, Teviot River Downs Station, Roxburgh, CHR 172741 (fr.); Healy s.n., 10.xii.1941, Waipara River, CHR 227583 (fr.); Macmillan 72/189, 23.i.1972, Waipara River, CHR 225653 (fr.); Macmillan 72/190, 23.i.1972, Boby Stream, N. of Mt. Grey, CHR (fr.); H.P. s.n., -.i.193-, Nelson, LINCOLN (fr.).

This variety is known from only about six widely scattered collections in Australia, but is relatively common in New Zealand. The reason for this discrepancy is not obvious.

A. agnipila var. *protenta* is distinguished from the other vars. in New Zealand by its more robust habit, (usually) branched inflorescence, and more numerous stamens.

var. **tenuispic**a (Bitter) Orchard, Trans. R. Soc. S. Aust. 93(1969)95-96 (Fig. 5)

Herbaceous perennial (15 -)30 - 50(- 66)cm tall, leaves (3.5 -)8 - 15(-20)cm long, stipules linear to deltoid, rarely slightly bifid at tip, 1.0 - 3.0(- 7.0)mm long, 1.0 - 1.5 mm wide, sparsely appressed pilose adaxially, moderately appressed pilose abaxially. Leaflets (11 -)17 - 23(- 27) per leaf, (7 -)10 - 15(- 19)mm long, (3.5 -)6 - 9(- 12)mm wide, with (9 -)12 - 15(- 17) serrations ½ - ¾(- ¾) of lamina width. Inflorescence an elongate, interrupted unbranched spike. Sepals 5, 1.0 - 2.0mm long, (0.5 -)0.8 - 1.3mm wide, sparsely pilose; stamens (3 -)4 - 5, (1.0 -)1.5 - 2.0(-.3.0)mm long; style 1 (rarely 2), 1.0 - 1.5(- 1.9)mm long. Fruit ovoid, densely spreading pilose, with (15 -)30 - 40(-50) slender, equal, glabrous spines, 1.0 - 2.0(- 3.0)mm long.

DISTRIBUTION. In Australia, known from south-eastern Queensland, eastern New South Wales, Victoria and south-eastern South Australia. In New Zealand this variety is known to occur only in the Canterbury - Marlborough area of South Island, with the exception of two collections from near Wellington (Fig. 10).

Specimens examined. North Island : Ashwin 412, Orongorongo, CHR (fl.,fr.); T. K[irk] s.n., near Wellington, OTA 016469 p.p. (fl.). South Island : Allan s.n., 28.i.1941, Waipara River bed at Waipara, CHR 227582 (fr.); Brownlie 714, 12.i.1968, near Hanmer R., CANU (fr.); Chapman s.n., 2.i.1972, Blondin Stream, Inverary, Mt Somers, CHR 219737 (fr.); Fryer s.n., 5.xii.1963, Springston, CHR 194824 (fr.); Healy 70/193, 27.xii.1970, Harewood Airport, Christchurch, CHR (fr.); Macmillan s.n., 18.xii.1962, near Hinds, CHR 140922 (fr.); Melville & Melville 5713, 23.xii.1961, Kaitorete Spit, CHR (fr.); Ritchie s.n., 13.i.1967, Upper Kowhai River, Seaward Kaikoura Mtns., CHR 176061 (fl.,fr.); H.P. s.n., -.i.193-, Nelson, LINCOLN p.p. (fr.).

This variety is easily distinguished from all others of the complex in New Zealand by the spreading indumentum on the body of the fruit. It is otherwise very similar to var. *aequispina,* but differs from var. *protenta* in its less robust habit and unbranched spike.

The Status of A. × anserovina *Orchard*

Hybrids between plants of *A. ovina* complex and the *A. anserinifolia* complex have been known to occur since at least 1870 (Buchanan 1871). The products of this cross are plants intermediate in habit between the rosette-forming *A. ovina* group and creeping *A. anserinifolia* group. They are also intermediate in the shape of their inflorescence, having a ± globular terminal head (as in *A. anserinifolia* s.l.), but in addition, a number of flowers lower on the stalk as in *A. ovina* s.l. The fruits are usually smaller than in either of the parents, and sterile (Figs. 6 - 9). The distribution of spines is also intermediate. The hybrid group has been named, successively, *A. ovina* var. *ambigua* Kirk (1899), *A sanguisorbae* subsp. *oleosenitens* Bitter (1911), *A. sanguisorbae* subsp. *novaezelandiae* var. *viridissima* Bitter (1911), and *A.* × *anserovina* Orchard (1969).

In the case of *A.* × *anserovina* the parents were described as *A. anserinifolia* and *A. ovina* s.l., although it was noted that field evidence in Australia suggested that the element of the *A. ovina* complex involved was usually *A. echinata* var. *retrorsumpilosa.* In New Zealand this variety is absent, and field observations show that its place is taken by *A. agnipila* var. *aequispina* in most, if not all, cases. The situation is further complicated by the fact that Allan (1961) adopted a much narrower concept of *A. anserinifolia* in New Zealand than is usual in Australia, with the result that the *A. ovina* group is recorded as hybridising with three different New Zealand species, (*A. anserinifolia, A. novaezelandiae,* and *A. microphylla).* At least the first two of these

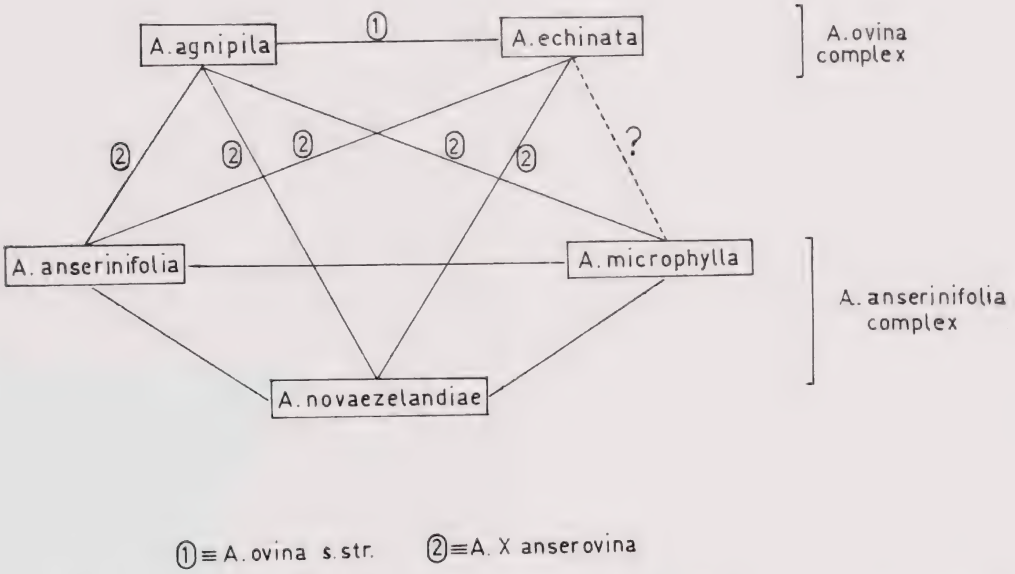


Fig. 11. Reported hybrids between species of the *A. ovina* and *A. anserinifolia* complexes in Australia and New Zealand.

can be matched with Australian collections. Buchanan (1871) recorded naturally occurring hybrids between all of these three New Zealand species, and Bitter (1911) named various garden forms of these hybrids *A.* × *rubescentiglauca, A.* × *eglochidiata, A.* × *gracillima, A.* × *cunctatrix, A.* × *lividella, A.* × *vinosa, A.* × *pallens, A.* × *brunnescens* and *A.* × *obscureolivacea.* Hybrids between *A. echinata* and *A. agnipila* were suggested by Orchard (1969) to be the origin of *A. ovina* s.str. in Australia. Thus in summary, the reported hybrids in these two groups (based on field evidence only) are as in Fig.11.

Because the species within the *A. ovina* group and within the *A. anserinifolia* group are separated on such small differences, all hybrids between the groups are indistinguishable on morphological criteria, especially when the normal hybrid variability is taken into account, and the only way to deduce hybrid parentage in the field is by searching for associated species. Yet, because of the frequency with which the hybrids occur, it seems useful to have a single binary name available for them. To have a separate name for each of the 5 or 6 inter-group hybrids (Fig. 11 - "2") would be futile, as the parentage of past collections has usually not been established, and in future collections will not always be obvious.

It is therefore proposed that the name *A.* × *anserovina* be applied to all those products of crosses between the *A. ovina* complex and the *A. anserinifolia* complex. Although not entirely satisfactory from a nomenclatural point of view, this solution seems the only practical one. Even if the name *A.* × *anserovina* is reserved for the cross *A. echinata* × *A. anserinifolia* s.str., the problem of applying a (formula) name to the other crosses is not solved when the exact parentage is in doubt.

A brief description of *A.* × *anserovina* follows, to facilitate comparison with the species described earlier.

Acaena × **anserovina** Orchard, Trans. R. Soc. S. Aust. 93(1969) 104. (Figs 6, 8, 9)

Erect or ascending perennial herb, stems sometimes sub-repent, 20 - 40cm tall, glabrous or sparsely appressed pilose. Leaves imparipinnate, stipulate, obovate, 6 - 13cm long, petiole and rachis sparsely pilose with appressed hairs. Stipules 1 - 3 - fid, (2.0 -)3.0 - 6.0mm long, 1.0 - 2.0mm wide, glabrous adaxially, appressed pilose abaxially. Leaflets 11 - 17 per leaf, ± obovate, (8-)12 - 14(- 19)mm long, 5 - 10mm wide, oblique at base, usually bright green on upper surface, silver glaucous below, serrate with (9 -)14 - 16 shallow teeth, upper surface glabrous, lower surface pilose, the hairs confined to the veins or spreading to the mesophyll. Inflorescence a globular terminal head, with a few flowers scattered irregularly along the axis below, and in the axils of the upper leaves. Sepals 4 - 5, 1.5 - 2.0mm long, 0.6 - 1.0mm wide, glabrous or pilose on the outer face. Stamens 2 - 5, cream, red or purple, 1.0 - 2.0mm long. Styles 1(-2). Fruit globular, obovoid or obconical, 1.5 - 3.0mm long, 1.5 - 2.0mm wide, densely spreading pilose; spines unequal, slender, 3 - 6 longer ones in upper part of fruit 2.0 - 5.0mm long, glabrous, or pilose only at base, 10 - 20 shorter spines 0.5 - 2.0mm long, irregularly distributed over lower part of fruit, glabrous. Seed 1, aborting at an early stage.

DISTRIBUTION. Present collections of *A.* × *anserovina* in New Zealand extend from about Christchurch to Taupo, but further collections will undoubtedly extend this range over the entire area occupied by the *A. ovina* complex. (Fig. 10).

Specimens examined. North Island : Allan s.n., Tangiwai Railway Station, CHR 172 (fl.,fr.); Allan s.n., 10.xi.1928, Tauherenikau River, CHR 261 (fr.); Allan s.n., 16.xi.1928, Tauherenikau River, CHR 174, 178 p.p., 269 (fl.,fr.); Allan s.n., 1.i.1937, Parewanui, Waitatapia, near Bulls, CHR 18354C, 3103, 3104 p.p., 3105, 3106 (fl.,fr.); Allan s.n., 1.i.1937, Parewanui, Rangitikei River, CHR 18354B (fr.); Allan s.n., 9.xi.1943, Mangahao, CHR 35415 (fl.,fr.); Healy s.n., 25.xi.1941), Seatoun, CHR 227590 (fl.); Herb. Kirk s.n., Wellington, CHR 226300 (fr.). South Island: Allan s.n., 28.i.1941, Waipara, CHR 227587 (fr.); Allan s.n., 4.xii.1948, near Wanaka township, CHR 227589 (fl.); Burrows s.n., Waiau R., CANU 6913 (fl.,fr.); Chapman s.n., 4.vi.1970, Awatere Valley, Molesworth Dashwood road, near Woodman's Bend, CHR 203256 p.p. (fl.,fr.); Collett s.n., 29.xii.,1968, Balmoral State Forest, CHR 186599 (fr.); Gordon s.n., 1.i..1968, inland Waiau-Kaikoura road, a little south of Conway Rivers, WELTU 7260 (fl.,fr.); Healy s.n., 16.xii.1941, Weka Pass, Waipara, CHR 227586 (fl.,fr.); Healy s.n., - i.1947, near Waikari, CHR 59062 (fr.); Healy s.n., 24.xi.1970, Meadowbank Station, Taylor R. near Blenheim, CHR 190183 (fl.,fr.); Healy H.81, 20.xi.1946, Omaka River, CHR (fl.,fr.); Healy 62/413, 20.xii.1962, Upper Rakaia River, CHR (fr.); Hynes s.n., 19.iv.1965, Rainbow Station, Wairau Valley, AK 104874 (fl.,fr.); Macmillan 68/331, 30.xii,1968. S. side of Rakaia Valley, CHR (fl.,fr.); Moore s.n., 5.iii.1953, Lower Acheron, CHR 180173 (fl.,fr.); Simpson s.n., -.xii.1946, between Luggate Bridge and Wanaka, CHR 227585 (fr.).

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ZINGIBERACEAE IN NEW ZEALAND

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Abstract. The two species of Zingiberaceae adventive in New Zealand are *Hedychium coronarium* var. *subditum* (Turrill) Naik and *H. gardnerianum* Roscoe. They are described and their history of introduction, present distribution, means of dispersal and nomenclature discussed. Other species of Zingiberaceae known to be in cultivation in New Zealand are listed.

Species of the Indo-malaysian family Zingiberaceae have been grown in New Zealand since at least 1865. Ludlam (1869) in an essay written for the 1865 Dunedin Exhibition stated that *Hedychium* ("Hodychium") *gardnerianum* and *H. coronarium* "have grown and bloomed here [Lower Hutt] for several years". Mason (1897) recorded that *Hedychium speciosum* was growing at Taita at that time. Mason's record is interesting since this is the only report of this species in New Zealand (at least until 1972, see list below), but as *H. speciosum* has in the past been confused with *H. gardnerianum*, it may have been the latter that Mason meant.

A search of old nursery catalogues and gardening journals in the Auckland Institute and Museum library showed that it was not until the mid-1950s that species of *Hedychium* were regularly offered to the public. Cheeseman (1925) did not include the genus in his list of naturalized plants, although Allan (1940), only 15 years later, mentioned that *H. gardnerianum* was escaping in North Island. The N.Z. Weed & Pest Control Society (1969) listed both *H. gardnerianum* and *"H. oblongum"* (= *H. coronarium* var. *subditum*, see below) as naturalized in New Zealand.

The two species have very similar ranges in the North Island, but only *H. gardnerianum* is known to escape in the South Island. They can easily be distinguished, as follows.

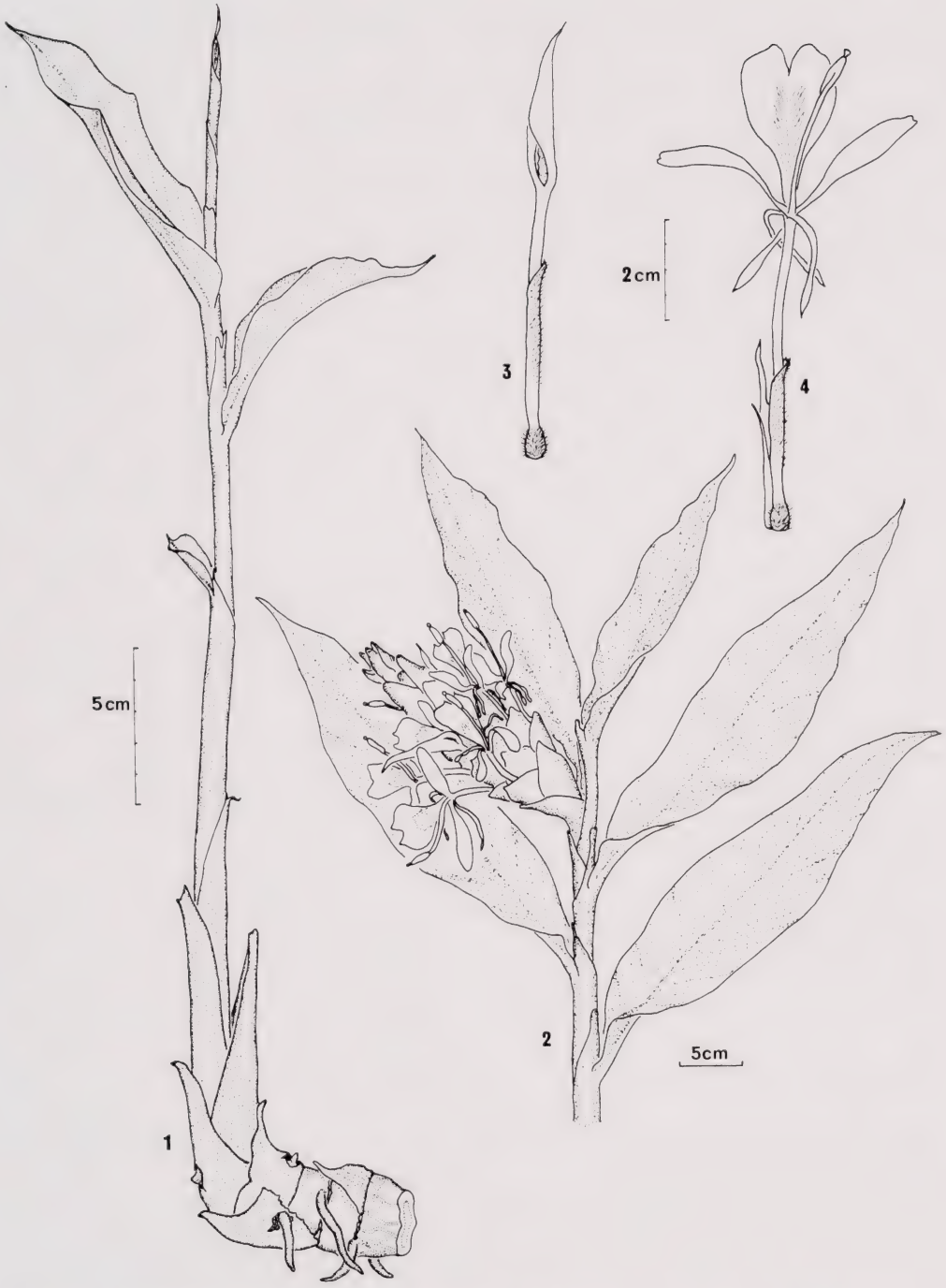
H. coronarium var. *subditum*	*H. gardnerianum*
Leaves lanceolate, 40-55 × 8.5 - 10cm, softly pilose on lower surface.	Leaves ovate, (20-) 30 - 45 × (10-)11 - 14 cm, glabrous.
Spike strobiloid, bracts erect, concealing axis.	Spike lax, bracts spreading, axis revealed between bracts.
Filament white to cream, about as long as lip.	Filament bright red, about twice as long as lip.
Perianth white to pale cream. Lip (3.0-)3.5 - 4.5 × 2.5 - 3.0cm	Perianth yellow. Lip 2.5 - 3.0 × 1.7 - 2.0cm.

Hedychium coronarium Koenig var. **subditum** (Turrill) Naik, in Naik & Panigrahi, Bull. Bot. Surv. India 3 (1961) 71. (Figs. 1-4)

Hedychium subditum Turrill, Kew Bull. (1914)370.

Hedychium flavum Roscoe, Pl. Monandr. Scit. (1828)t.49, non *H. flavum* Roxb.

Plant 2 - 3m tall, spreading vegetatively by thick fleshy rhizomes. Leaves lanceolate to linear-lanceolate, 40 - 55cm long, 8.5 - 10cm wide, acute to attenuate at tip, ligule oblong, 3.5 - 5.0cm long, 2.0 - 2.5cm wide, often reddish, finally membranous.



Figs. 1-4. *Hedychium coronarium* var. *subditum*. 1. Portion of rhizome and new shoot. 2. Inflorescence. 3. Bud. 4. Flower and two buds from axil of a single bract. (All A. E. Orchard 3361).

Inflorescence a terminal, strobiloid spike, often set at an angle to axis. Bracts erect, imbricate, concealing axis, broadly ovate to oblong, (3.0-)3.5 - 5.0cm long, 2.0 - 3.0cm wide, obtuse, margin membranous, fimbriate. Flowers 3 per bract, each subtended by a membranous, hyaline secondary bract, 2.0 - 2.5cm long. Calyx white to cream, tubular, oblique, (2.5-)3.5 - 4.0cm long, 4.0mm diam., minutely 3-toothed at apex, slit for $\frac{1}{3}$ of length, pilose, approx. $\frac{1}{2}$ length of floral tube. Floral tube 6.5 - 7.5cm long, 3.0mm diam., yellowish. Perianth segments 3, yellow-green, narrowly oblanceolate, 3.0 - 3.8cm long, 0.3 - 0.5cm wide, acute. Lateral staminodes 2, white to cream, oblanceolate, 3.5 - 4.3cm long, (0.6-)0.8 - 1.3cm wide, obtuse or slightly bilobed. Lip white to cream, often with yellow patch near base, obcordate, (3.0-)3.5 - 4.5cm long,2.5 - 3.0cm wide, shortly unguiculate, bilobed, with sinus 3.0 - 7.0mm deep. Stamen ± equal to or slightly exceeding lip, filament (2.5-)3.5cm long, white to cream, anthers 1.3 - 1.5cm long. Ovary barrel-shaped, 3.0 - 4.0mm long, 3.0mm diam., 3-locular, densely appressed pilose. Style and stigma green, protruding at apex of anther lobes. Fruit not observed.

DISTRIBUTION. *H. coronarium* ranges widely throughout North Auckland province, particularly along the eastern coast, and is also found on the western side of Coromandel Peninsula (Fig. 5). It has been reported from as far south as Kawhia Harbour, but this record is not yet supported by collections.

Specimens examined. North Island: Adams s.n., Hape Stream, Thames, CHR 143560; Blick s.n., 26.vi.1971, Warkworth, CHR 72013; Braggins s.n., 16.v.1973 Haruru Falls, ca 3.5km west of Paihia, AK 132557; Esler & Astridge 4030, 12.vi.1972, "Bankside", Silverdale, AK, CHR; Esler & Astridge 4036, 11.v.1972, Alberon Park, Parnell, CHR; Fox s.n., 29.iv.1969, Domain pond, Auckland, AK 132552; Fox s.n., 4.v.1972, cultivated in Auckland Domain, AK 132555; Goodey s.n., 9.v.1969, cultivated Parnell, AK 120555; Goodey s.n., 21.iv.1972, cultivated Parnell, AK 129656, 129657; Halliday 3, 24.ii.1973, *ca.* 2km north of Towai, on road to Kawakawa, AK; Halliday 10, 24.ii.1973, *ca.* 13.5km south of Kaeo on Highway 10, AK; Halliday 11, 24.ii.1973, *ca.* 3km south-east of Kaeo on Highway 10, AK; Halliday 13, 24.ii.1973, *ca.* 8km north-west of Kaeo on road to Tauranga Bay, AK; Halliday 19, 24.ii. 1973, 1km north-west of Ohaeawai, AK; Mason, Cooper & Moar s.n., 2.xii.1949, roadside near Kaeo, AK 35831; Mason & Moar 333, 2.ii.1949, Kaeo, CHR; Orchard 3278, 21.iv.1972, Piha beach, AK; Orchard 3361, 4.vi.1972, *ca.* 2.5km west of Wenderholm turnoff on Highway 1, AK; Orchard 3363, 4.vi.1972, Highway 1, at Wenderholm turnoff, AK; Orchard 3656, 15.x.1972, northern landing of Rawene ferry, Hokianga Harbour, AK; Orchard 3937, 10.iii.1973, Coromandel township, in waste ground near the wharf, AK; Orchard 3963, 14.iv.1973, *ca.* 5km south-west of Leigh on road to Warkworth, AK; Reynolds s.n., 15.iii. 1972, Anzac Rd, Whangarei, PDD-B; Wood s.n., 30.iv.1972, near the bridge at Huia, AK, PDD-B.

The cultivated forms of this variety were treated under the name *Hedychium flavum* Roxb. until Turrill (1914) pointed out that this name was wrongly applied and proposed the substitute *H. subditum.* However, this change was overlooked in New Zealand, and the name *H. flavum* has continued to be used until very recently, particularly for the forms of *H. coronarium* in which the lip is cream or white with a basal yellow patch (eg. Matthews & Matthews, 1960). Forms of this variety with pure white flowers have tended to be called *H. coronarium* (Matthews & Matthews, 1960; Harrison, 1963; Harrison & Harrison, 1967).

Naik & Panigrahi (1961), on the basis of further collections from Eastern India, pointed out that many of the previously described species related to *H. coronarium* were connected to it by extensive ranges of intermediates in this area. They therefore reduced many of these species (including *H. subditum*) to the rank of varieties of *H. coronarium.* Recently the N.Z. Weed & Pest Control Society (1969) suggested the name *H. oblongum* K.Schum. for the New Zealand species. However *H. oblongum* is

described as having a glabrous ovary, a longer calyx, and much smaller lip and stamen filament than *H. coronarium*. Only one collection from New Zealand (Blick, CHR 72013) comes close to *H. oblongum* in flower size, but has a pilose ovary and is here considered only a depauperate form of *H. coronarium* var. *subditum*.

As this species does not set seed in New Zealand it can only spread by means of its thick fleshy rhizomes, or by human agencies. That the latter can easily account for the present distribution of the species is shown, for example, by Halliday 10, which was collected from a small but flourishing clump of *H. coronarium* var. *subditum*, growing many kilometres from the next population, but in association with *Agapanthus, Crocosmia, Watsonia* and other hardy garden species amongst gorse, about 50 metres from the side of a main road.

Hedychium gardnerianum Roscoe, Pl. Mondandr. Scit. (1828) t. 62. (Figs. 6-11)

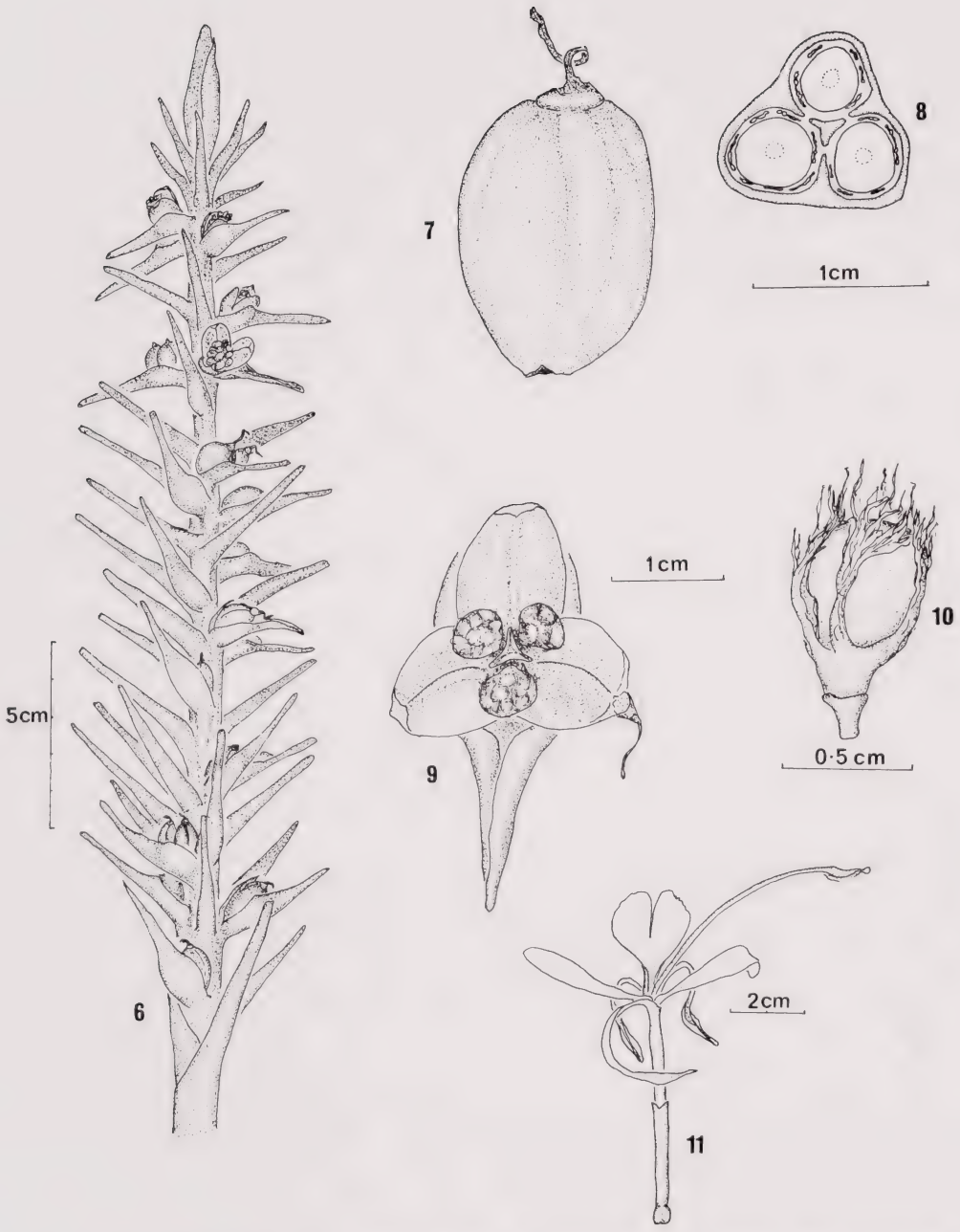
Plant ½-2m tall, spreading vegetatively by thick fleshy rhizomes. Leaves narrow-ovate to ovate (20-)30-45cm long, (10-)11-14cm wide, apex acute to acuminate, sub-glaucous on lower surface, glabrous, ligule ovate to oblong, 2-3cm long, 2-3cm wide, blunt, finally membranous.

Inflorescence a terminal, lax spike, often at an angle to axis. Bracts green, spreading, tightly rolled, revealing axis, 3.3-4.0cm long, *ca* 1.5-1.7cm wide, apex obtuse, margin membranous, glabrous. Flowers 2 per bract, each subtended by a hyaline, membranous, secondary bract, *ca*. 2cm long. Calyx yellow, tubular, 2.0-3.3cm long, 0.3-0.4cm diam., oblique, minutely 3-toothed at apex, slit to depth of 4.0-5.0mm, sparse tuft of hairs on tips of teeth. Floral tube yellow, 4.5-5.0cm long, 0.3cm diam. Perianth segments 3, yellow-green, linear to narrow-oblanceolate, 3.0-3.5cm long, 2.0-3.0mm wide. Lateral staminodes 2, yellow, oblanceolate, 2.5-3.3cm long, 0.5-0.7cm wide, blunt. Lip yellow, sometimes slightly flushed orange at base, ovate to obovate, 2.5-3.0cm long, 1.7-2.0cm wide, unguiculate, bilobed, sinus 0.5-0.6cm deep, sometimes with small apiculus at base. Stamen much exceeding lip; filament bright red, 5.0-6.0cm long, anthers 0.8-1.0cm long. Style and stigma greenish, protruding beyond anthers. Ovary ± globose to barrel-shaped, 3.0mm long, 3.0mm diam., weakly longitudinally ribbed, glabrous, 3-locular.

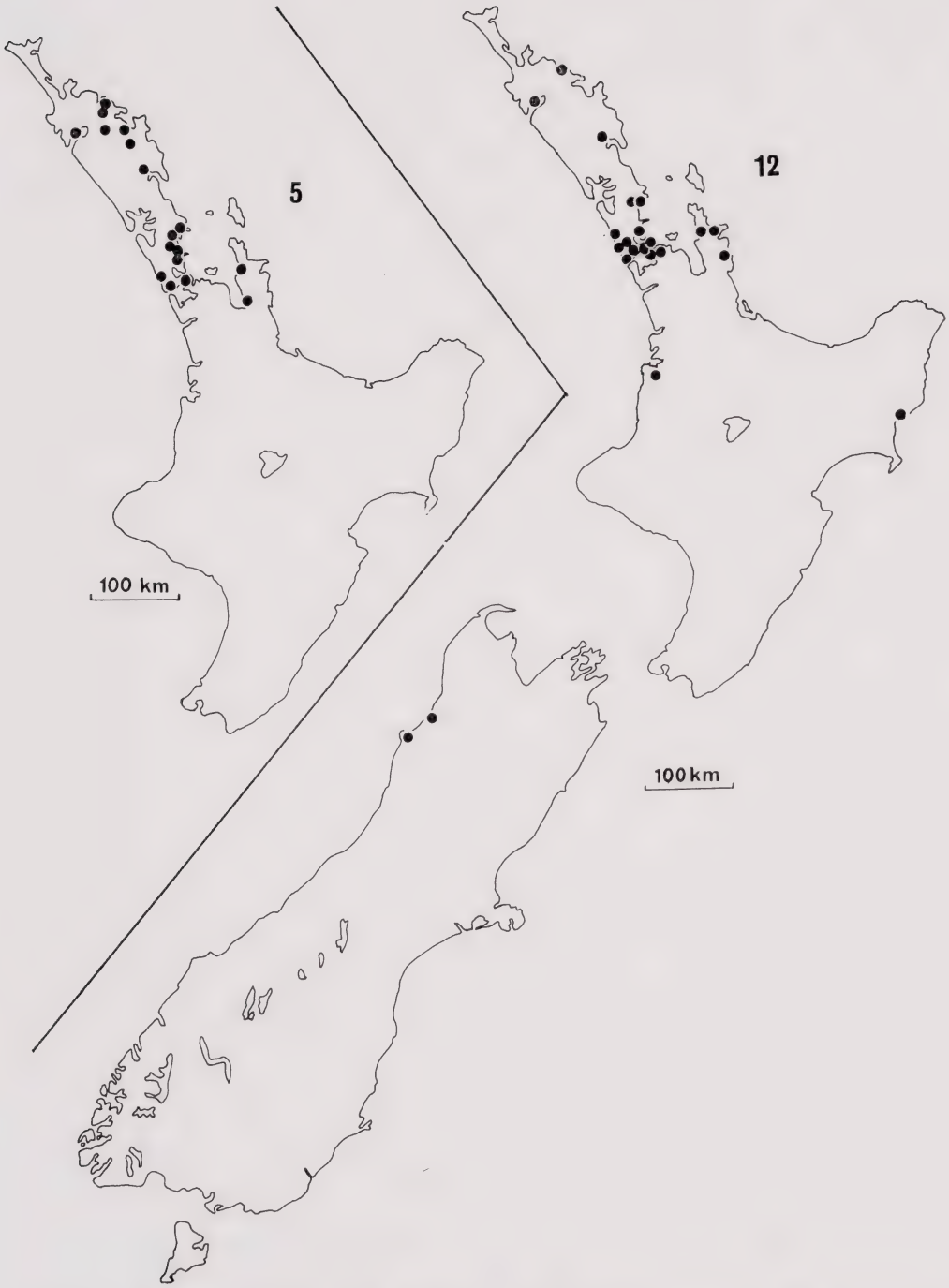
Fruit usually 1, rarely 2, per bract, ovoid, 1.0-1.5cm long, 1.0-1.5cm diam., 3-lobed, crowned by persistent floral tube, loculicidal, yellow-orange, seeds numerous, dark red, surrounded by fimbriate scarlet aril.

DISTRIBUTION. This species has a range very similar to that of *H. coronarium* in the North Island, and is also known from near Westport in the South Island (Fig. 12).

Specimens examined. North Island. Braggins s.n., 3.iii.1973, south edge of Kawhia Harbour, along Oreke Creek, just south of Kinohaka, AK 132561; Chamberlain s.n., 2.vii.1952, Gisborne, CHR 82061; Edgar & Astridge s.n., 12.x.1972, Auckland, West Coast Rd, near Kauri Rd, CHR 224789; Fox s.n., 4.v.1972, cultivated Auckland Domain, AK 132559; Haddow s.n., 27.viii.1970, Waitakere Ranges, AK 126463; Halliday 1, 31.i.1973, Piha, near track to Glen Ness falls, AK; Halliday 2, 24.ii.1973, Sandspit, AK; Halliday 12, 24.ii.1973, *ca*. 8km north-west of Kaeo, on road to Tauranga Bay, AK; Halliday 18, 24.ii.1973, *ca*. 2km north of Kohukohu, AK; Halliday 20, 7.iii.1973, roadside near Long Bay, AK; Hodgkins s.n., Auckland, CHR 3034; Lloyd s.n., 20.vii.1949, Onehunga, AK 25040; Orchard 3302, 25.iv.1972, Maraetai-Whitford road near turnoff to Kelly's Beach, AK; Orchard 3303, 29.iv.1972, Ladies Point, St Heliers, AK; Orchard 3370, 1.vii.1972, Mountain Road, *ca*. 5.5km west of Oratia, AK; Orchard 3371, 1.vii.1972, Scenic Drive, *ca*. 2.5km west of Titirangi, AK; Orchard 3392, 26.vii.1972, Winstone Track, Piha Valley, AK; Orchard 3932, 25.ii.1973, *ca*. 5km north-west of Warkworth on Highway 1, AK; Orchard 3933, 27.ii.1973, Muriwai Beach, AK; Orchard 3936, 27.ii.1973, *ca*. 8km north-east of Muriwai Beach, AK; Orchard 3937, 10.iii.1973, Coromandel, near the wharf, AK; Orchard 3955, 10.iii.1973, Coro-



Figs. 6-11. *Hedychium gardnerianum*. 6. Infructescence with mature and immature fruits. 7. Fruit just before splitting. 8. Transverse section of fruit. 9. Bract and open fruit, seen from above. 10. Seed, surrounded by aril. 11. Flower. (Figs. 6 - 10. A. E. Orchard 3370. Fig. 11. T. A. Halliday 1.).



Figs. 5, 12. Distribution in New Zealand. 5. *Hedychium coronarium var subditum.* 12. *Hedychium gardnerianum.*

mandel-Whitianga road, near Te Rerenga, AK; Orchard 3960, 11.iii.1973, Tairua, AK; Reynolds s.n., 15.iii.1972, Whangarei, PDD - B; Wood s.n., 30.iv.1972, by the bridge at Huia, AK 132560; Wood 5419, 14.iv.1951, bank of Huia Stream, AK. South Island : Mason & Moar 2351, 7.ii.1953, Westport, east side of Buller River, CHR; Mason & Moar 2360, 9.ii.1953, Granity, Buller Co., CHR.

Although, like *H. coronarium,* this species owes much of its present distribution to the human propensity to dump garden rubbish on the sides of roads, it also has the advantage of setting viable seeds. These have been distributed widely, presumably by birds, and many of the existing populations have undoubtedly been established from seedlings. Chamberlain (CHR 82061) recorded that *H. gardnerianum* had "escaped over nearly 3 acres [1.2 hectares] of hillside" near Gisborne. In parts of the Waitakere Ranges, particularly near Piha, seedlings have even become established in relatively undisturbed broadleaf forest, and the species threatens to become a serious weed. This has happened elsewhere, as for example, in the Azores. It was introduced there between 1850 and 1875 and began spreading almost immediately. Rock pigeons carried seeds to all of the outlying islands, where it became established in all types of soils. In better soils "the rotstocks become so thick and strong that they invade and slowly kill whole woods of well grown pines, *Acacia melanoxylon,* etc, if they happen to be in its way . . . Before the last War, I was told that the conservative value of the land overrun by Hedychium should be put at between 25 and 35 million pounds gold." (quoted in Roper, 1960).

Naik & Panigrahi (1961) following Baker (1892) recognise two varieties in this species, separated on flower colour and the depth of the sinus of the lip, var. *gardnerianum* having lemon-yellow flowers and an entire or emarginate lip, var. *pallidum* having pale yellow flowers and a distinctly bifid lip. The New Zealand plants vary in both these characteristics, and there seems little point in distinguishing varieties here. However, if this is deemed necessary, then most plants are closest to *H. gardnerianum* var. *pallidum* (Regel) Baker.

SPECIES IN CULTIVATION.

As well as the above two taxa there are a number of other species in cultivation in New Zealand. The following list, while not claimed to be exhaustive, probably contains most of those commonly grown.

Alpinia speciosa (Wendl.) K. Schumann — growing in private Auckland gardens; flowering in May.

Brachychilus horsfieldii (R. Br.) G. O. Peters — ephiphyte, grown in Auckland as a geophyte; flowering in April, fruiting from May to August.

Curcuma roscoeana Wall. — a plant is growing at the Botany Department, University of Auckland, under this name but has not yet flowered; identification tentative.

Hedychium coronarium var. *maximum* (Rosc.) Baker — a flower collected from a garden in Mt Albert Road, Auckland (Esler s.n.,21.iii.1972,PDD - B) is very much larger than is normal for var. *subditum,* and comes closest to the above variety. It has a calyx 3.5cm long, floral tube 7cm long, perianth lobes 3.5 x 0.5cm, staminodes 5.0 x 2.3cm, lip 5.0 x 4.7cm, filament 3.5cm, and was apparently pure white, with a flush of yellow on the lower part of the lip.

Hedychium densiflorum Wall.—Seedlings are growing at the Botany Department, University of Auckland under this name, but have not yet flowered; identification tentative.

Hedychium gracile Roxb. — growing at the Botany Department, University of Auckland and in a private garden, Auckland. The plants in New Zealand come closer to Schumann's description of *H. glaucum* Roscoe than to *H. gracile,* but Rao & Verma (1969) considered these two conspecific on the basis of intermediate populations found in the Jaintia Hills, Assam. This species flowers in Auckland in April.

Hedychium greenii Smith — growing at the Botany Department, University of Auckland, and in private gardens in Auckland; flowers from April to May.

Hedychium luteum Baker — this species, grown at the Botany Department, University of Auckland and in some private gardens in Auckland under the name *H. coccineum* var. *carneum,* matches Schumann's description (1904) of *H. luteum* much better. Schumann described the plant from specimens formerly cultivated in Berlin. However, Naik & Panigrahi (1961) stated that the only true specimen of *H. luteum* that they knew of was the type, and this was, in their opinion, only a form of the variable *H. coronarium.* The plants in cultivation in New Zealand, and the plant described by Schumann, are very different from *H. coronarium* in flower size and colour, leaf proportion and indumentum, relative lengths of the stamen and lip, and in spike structure.

Hedychium speciosum Wall. — the Botany Department, University of Auckland has two seedlings under this name, but they have not yet flowered; identification tentative.

Hedychium venustum Wight — the Botany Department, University of Auckland has a plant under this name, but it has not yet flowered; identification tentative.

Hedychium sp. — a specimen of *Hedychium* from a roadside clump, *ca.* 1 mile (1.6km) from Kaiwaka on the road to Mangawhai (M. Goodey s.n., 27.ii.1972, CHR 227581) does not seem to match any published description. It has broad glabrous leaves and a lax spike as in *H. gardnerianum,* but cream flowers borne in 3's, the filament scarlet-orange and much exceeding the lip. The flowers are larger than *H. gardnerianum* in most respects. The plant has been tentatively identified as a cream-flowered cultivar of *H. coccineum* var. *carneum.*

Roscoea cautleoides Gagnepain — grown at Prebbleton, Canterbury; flowering in November.

Zingiber officinale Roscoe — occasionally grown as a curiosity in Auckland, but it does not flower here.

Acknowledgements. The collections of Botany Division, D.S.I.R. (CHR) were kindly made available to me on loan, and Mr A. E. Esler, Botany Division Substation, Mt Albert, loaned his reference collection specimens (cited as PDD-B above). Mr J. Braggins drew my attention to the large number of species in cultivation at the Botany Department, University of Auckland. Miss J. H. Goulding assisted in the search for early references to Zingiberaceae in New Zealand.

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HYPHALUS WISEI SP.N., A NEW INTERTIDAL BEETLE FROM NEW ZEALAND (COLEOPTERA: LIMNICHIDAE)

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Abstract. A second species of the genus *Hyphalus* (Coleoptera: Limnichidae), *H. wisei* sp.n., is described on material taken in the intertidal zone on the North Island of New Zealand. Additional localities for *Hyphalus insularis* Britton, on the east coast of Australia, are recorded.

Following publication of the description of the intertidal limnichid species *Hyphalus insularis* (Britton 1971, J. Ent. (B) 40 (2) : 83-91), Mr K. A. J. Wise of the Auckland Museum kindly sent me some small beetles which he had taken between tide marks on the coast of New Zealand. These proved to represent a second species of *Hyphalus* which is described below.

I have also received, by courtesy of Mr Louis Koch of the Western Australian Museum, specimens of *H. insularis* collected on the Queensland coast by Mr Derham Giuliani of Big Pine, California. Mr Giuliani made collections of insects at many points on the Australian coast over a period of two years and has presented his material to the Western Australian Museum.

The new localities for *Hyphalus insularis* are as follows.

Alligator Bay, *c.* 160km N of Rockhampton, Q.

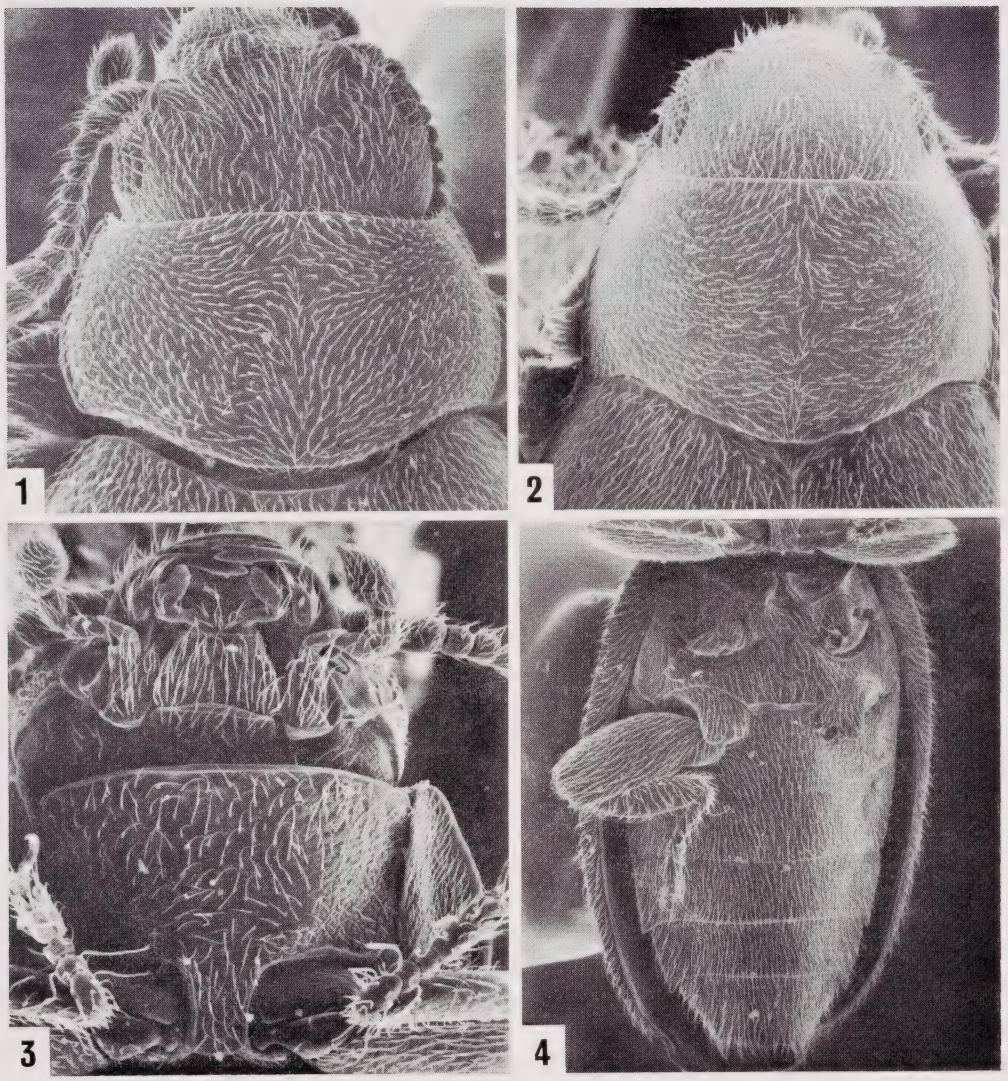
Dingo Beach (22° 08′ S, 149° 33′ E), Q.

Sand Bay, near Cape Hillsborough (20° 56′ S, 149° 02′ E), Q.

Yorkey's Knob, Cairns (16° 48′ S, 145° 44′ E), Q.

Green Island (16° 46′ S, 145° 48′ E), Q.

Mr Giuliani notes that he did not find this species in the intertidal zone to the north and south of these localities. Localities examined to the south were Round Hill Head, Q. (24° 10′ S, 151° 53′ E), Double Island Point, N.E. of Gympie, Q. (25° 56′ S, 153° 11′ E), and North Head, E. of Nambour, Q. (24° 45′ S, 152° 24′ E). Localities to the north, at which the species was not found, were Port Douglas (16° 29′ S, 145° 28′ E), Q, and Finch Bay, Cooktown (15° 28′ S, 145° 16′ E), Q. Present indications are, therefore, that the species does not occur south of the Tropic of Capricorn and that it may be absent from the far north coasts. At Sand Bay the beetles were found on rocks half a mile out from high tide mark, whereas on Green Island they were on "beach rock" as on Heron Island.



Figs. 1-4. 1, 3, 4. *Hyphalus wisei* sp. n. 1. Head and pronotum, dorsal. 3. Head and prothorax, ventral. 4. Metasternum and abdomen, ventral. 2. *Hyphalus insularis* Britton. Head and pronotum, dorsal.

Family LIMNICHIDAE

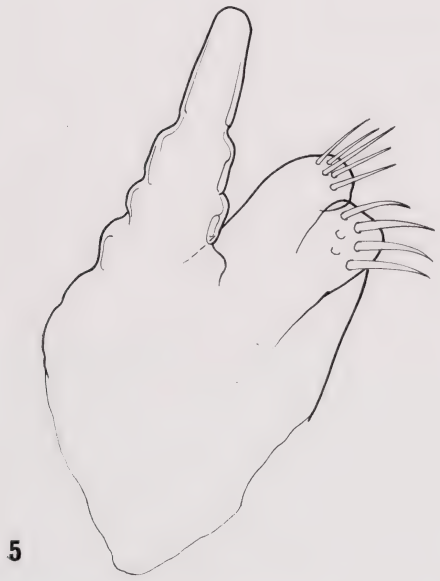
Subfamily HYPHALINAE

Hyphalus wisei sp.n. (Figs. 1-6)

ADULT Length 1.1 - 1.2mm. Colour of body surface uniform black. Body with a uniform dense clothing of short pale setae giving it an overall greyish appearance. Legs black, except tarsi brown. Antennae and maxillary palps brown.

The species is very closely related to *Hyphalus insularis* but distinguished as follows.

	wisei	*insularis*
Prosternal intercoxal process	narrow (Fig. 3)	wider
Proportions of elytra and abdomen	more elongate (ratio of length/ max. wdth *c.* 1.55/1)	less elongate (ratio of length/max. width *c.* 1.30/1)
Separation of hind coxae	less (ratio of distance between coxae/width of one coxa *c.* 1/1)	greater (ratio of distance between coxae/ width of one coxa *c.* 1.6/1).
Posterior angles of pronotum	more obtuse (Fig. 1)	less obtuse (Fig. 2)
Ratio of max. width/mid length of pronotum	*c.* 1.5/1 (Fig. 1)	*c.* 1.6/1 Fig. 2)
Aedeagus	median lobe shorter than parameres	median lobe as long as parameres



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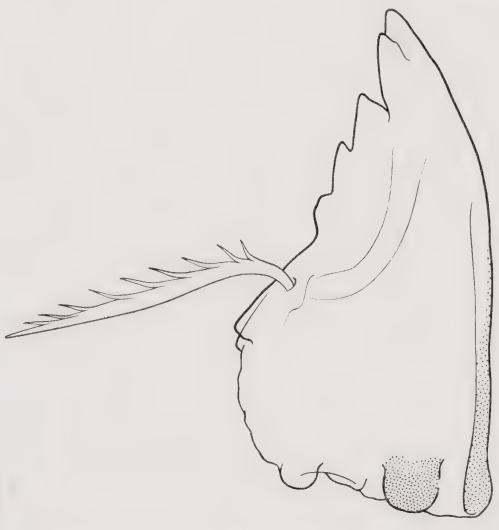

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Figs. 5, 6. *Hyphalus wisei* sp. n., larva. 5. Left maxilla. 6. Right mandible.

LARVA Length 2mm. Colour pale to dark brown; very similar in form to larva of *H.insularis*. Maxilla as Fig. 5; mandible as Fig. 6, with a long penicillus on middle of inner face.

A similar but shorter penicillus is present on the mandible of the larva of *H.insularis*. A penicillus is present on the larval mandibles in the families Ptilodactylidae, Psephenidae, Helminthidae and Dryopidae but not in the Limnichidae: Limnichinae.

Types. NEW ZEALAND: North Island, Rodney County, on a rock platform, exposed at low tide, on the mainland opposite Goat I, near Cape Rodney, N. of Leigh (36° 16′ S, 174° 48′ E), 5. xii. 1968, K. A. J. Wise. Holotype and 2 paratypes lodged in collection of Auckland Institute and Museum, 1 paratype in collection of the Entomology Division, D.S.I.R., New Zealand, 2 paratypes in Australian National Insect Collection, Canberra, A.C.T.

THE TAXONOMY OF BENTHOVOLUTA HILGENDORFI (VON MARTENS) AND ALLIED TURBINELLID GENERA (MOLLUSCA: VOLUTACEA)

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Abstract. The turbinellid species *Benthovoluta hilgendorfi,* believed to be endemic to Japan, is recorded from a specimen collected by Dr Th. Mortensen's Pacific Expedition of 1914-16 at Zamboanga, Philippine Islands. The genera *Ptychatractus, Metzgeria, Benthovoluta, Surculina* and *Ceratoxancus* are assigned to the subfamily Ptychatractinae, in the family Turbinellidae. The New Zealand genus *Chathamidia* is removed from the Muricidae and transferred to the Turbinellidae, in the synonymy of *Surculina.*

Species of the subfamily Ptychatractinae inhabit deeper and cooler waters with an approximate benthic range extending from 100-1067 fathoms (183-1953m). They have been recorded from Japan, the Philippines, New Zealand, the Galápagos Islands, California, the Gulf of Panama, Bering Sea, Caribbean, N.W. Atlantic, the Azores and the North Sea. Presently 17 species are referable to the ptychatractine Turbinellidae.

Family TURBINELLIDAE Swainson, 1840

Subfamily PTYCHATRACTINAE Stimpson, 1865

1865. Ptychatractidae Stimpson, Americ. J. Conch., 1: 59.

Stimpson's family-group name (1865) has been utilised in a subfamilial sense for the 5 deep water turbinellid genera which contain species with fusiform, moderately thin shells with convex whorls and a sculpture of moderately broad axial ribs and spiral striae. The outer lip is usually thin, the columella is either edentulous or has 2-3 folds and the siphonal canal is produced, straight or recurved. The size ranges from 20.0 to 90.00mm, and the operculum, when present, is small, thin and translucent and has a terminal nucleus. The radular ribbon is very small, formula 1-1-1, rachiglossate, the rachidians have an arched base and 3 cusps, the laterals are simple, hooked and unicuspid with a swollen base and are similar to the laterals of Muricidae and Vexillidae. Species of Ptychatractinae differ from other groups of Turbinellidae in features of lighter, more fusiform and slender shell, narrow, elongate aperture, a produced siphonal canal and a distinctly different radular pattern. Species of Ptychatractinae were usually assigned to the Volutidae, Fasciolariidae, Turridae and Muricidae, and a summary dealing with the transfer to the Turbinellidae has been given by Rehder (1967).

Genus **Ptychatractus** Stimpson, 1865

Ptychatractus Stimpson, 1865, Americ. J. Conch., 1: 59. Type species by OD *Fasciolaria ligata* Mighels & Adams, 1842.

Shell small, 18.0-25.0mm in length, fusiformly ovate, buccinoid in appearance, whorls convex, sculptured with spiral threads but no axial ribs. Aperture oblong ovate, smooth within, outer lip thin, columella with 2 weak folds, canal moderately produced,

straight or recurved. Operculum present, small. Radula with a deeply arched, tri-cuspid rachidian and simple, elongated, hook-shaped laterals.

Ptychatractus ligatus (Mighels & Adams, 1842) (Fig. 3)

1842. *Fasciolaria ligata* Mighels & Adams, Boston J. Nat. Hist., 4: 51, pl. 4, fig. 17 (Mingan, Gulf of St. Lawrence).

1865. *Ptychatractus ligatus* (Mighels & Adams), Stimpson, Americ. J. Conch., 1: 59, pl. 8, fig. 8 (radula); 1881 Tryon, Man. Conch., 3: 72, pl. 40, fig. 185; 1901 Whiteaves, Cat. Mar. Invert. E. Canada, Ottawa, p. 191.

This small, *c.* 20.0mm long, operculate species has been recorded from the Gulf of St. Lawrence and Nova Scotia, N.W. Atlantic.

Ptychatractus occidentalis Stearns, 1873 (Fig. 14)

1871. *Ptychatractus occidentalis* Stearns, Conch. Memoirs, 12: 3 *(nomen nudum)*; 1873 Stearns, Proc. Calif. Acad. Sci., 5: 79 (Nagai Shumagin Is., Aleutian Is.); 1921 Dall, U.S. Nat. Mus. Bull., no. 112: 87, pl. 6, fig. 8; 1927 Oldroyd, Mar. shells W. coast Nth. America, 2 (1): 175, pl. 7, fig. 1.

The species is similar to *P. ligatus* and lives in the Bering Sea, North Pacific.

Ptychatractus californicus Dall, 1908

1908. *Ptychatractus californicus* Dall, Bull. Mus. Comp. Zool. Harvard, 43 (6): 299 (off San Diego, California, 822 fathoms (1504m); 11.0 × 5.5 × 5.5mm).

Genus **Metzgeria** Norman, 1879

Metzgeria Norman, 1879, J. Conch., 2: 56. Type species (art. 67 (i) of ICZN) *Lathyrus albellus* Dunker & Metzger, 1874 = *Latirus albus* Jeffreys in Thomson, 1873 (*nom. subst. pro Meyeria* Dunker & Metzger, 1874).

1874. *Meyeria* Dunker & Metzger, Jahrb. deut. Malakozool. Gesell., 1: 150. Type species by M *Lathyrus albellus* Dunker & Metzger, 1874 = *Latirus albus* Jeffreys in Thomson, 1873 (non *Meyeria* McCoy, 1849, in Crustacea).

The genus contains 2 species from the North Sea and East Atlantic. The species are small, 20.0-25.0mm in length, fusiform, with convex whorls, axial ribs and spiral threads. The siphonal canal is slender and produced, straight or recurved, and the columella has 2 weak folds. The operculum has a terminal nucleus. The radula has rhomboidal, weakly excavated and tricuspid rachidians, with laterals simple, sickle-shaped and unicuspid.

Metzgeria alba (Jeffreys in Thomson, 1873) (Figs. 6, 15)

1873. *Latirus albus* Jeffreys in Thomson, Depths of the Sea, p. 464, fig. 77 (North Sea).

1881. *Meyeria alba* Jeffreys, Tryon, Man. Conch., 3: 73, pl. 39, figs. 190-193.

1929. *Metzgeria alba* (Jeffreys), Thiele, Handb. syst. Weicht., 1: 343, fig. 409 (radula); 1968 Nordsieck. Europ. Meeres-Gehäuseschnecken, p. 150, pl. 25, fig. 85.00.

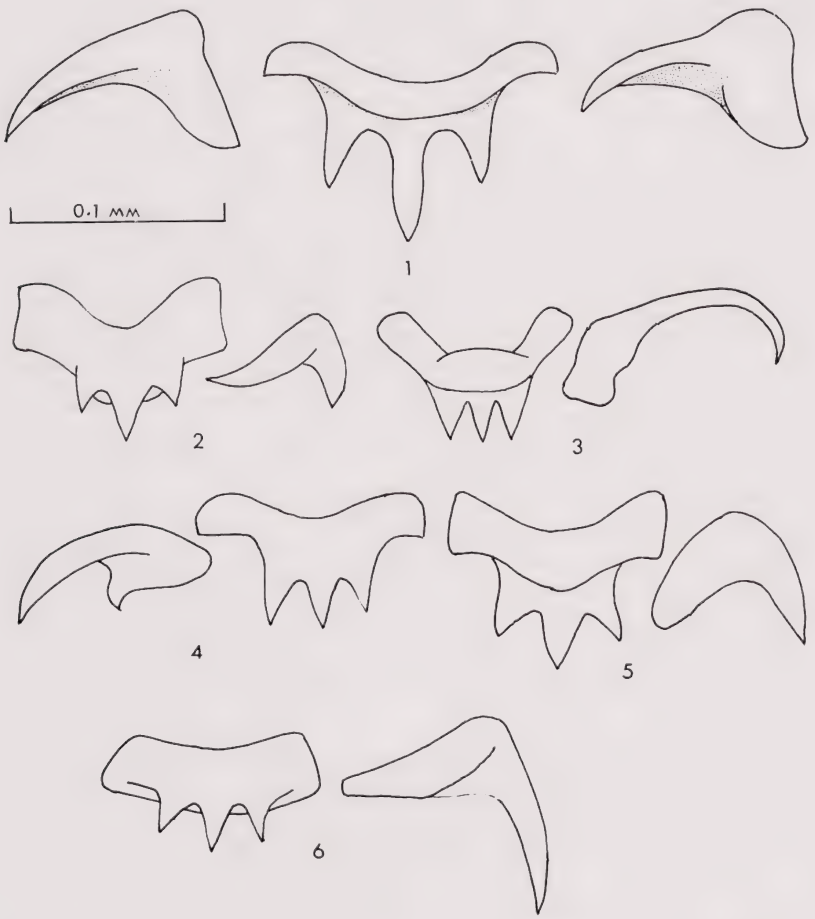
The species lives in the North and Norwegian Seas and attains a size of about 30.0mm.

Metzgeria decorata (Locard, 1897)

1897. *Meyeria decorata* Locard, Exped. sci. trav. Talisman, p. 337 (Azores, 1258m).

1968. *Metzgeria decorata* (Locard), Nordsieck, Europ. Meeres-Gehäuseschnecken, p. 150, pl. 25, fig. 85.01.

This species from the Azores is similar in size and form to *M. alba,* but has more prominent spiral threads which override the axial ribs and become nodulose at the point of intersection.



Figs. 1-6. Radulae — one or half a transverse row. 1. *Benthovoluta hilgendorfi* (von Martens). Zamboanga, Philippine Is, 450m. 2. *B. meekiana* (Dall). Off Morro Light, Cuba, 400 fathoms (732m) (after Bayer 1971, fig. 55D). 3. *Ptychatractus ligatus* (Mighels & Adams). Coast of Maine or Nova Scotia (after Stimpson 1865, pl. 8, fig. 8). 4. *Surculina cortezi* (Dall). Probably from California (after Rehder 1967, textfig. 10). 5. *S. expeditionis* (Dell). Chatham Rise, New Zealand, 260 fathoms (476m) (after Dell 1956, fig. B15). 6. *Metzgeria alba* (Jeffreys in Thomson). Probably from the North Sea (after Thiele 1929, textfig. 409).

Genus **Benthovoluta** Kuroda & Habe, 1950

Benthovoluta Kuroda & Habe, 1950, Illust. Cat. Jap. Shells, no. 5: 37. Type species by OD *Phenacoptygma ? kiiensis* Kuroda, 1931 = *Voluta hilgendorfi* (von Martens, 1897).

Small to moderately large species, 20.0-90.0mm in length, fusiform and moderately thin, whorls convex, sculptured with axial ribs and spiral striae, axial sculpture becoming usually obsolete on the last whorl. Aperture narrow, fusiformly elongate, smooth within, outer lip thin, columella with 2-3 folds, first or second posterior fold largest; siphonal canal produced and straight. Operculum very small, thin, translucent yellowish-brown, 1.5-3.7mm in length. Radula with excavated, tricuspid rachidians and simple, sickle-shaped laterals.

Benthovoluta was described by Kuroda & Habe (1950) in the Volutidae and was transferred to the Turbinellidae by Kuroda (1965) who had earlier (1931) described the type species under the name of *Phenacoptygma ? kiiensis.*

Benthovoluta hilgendorfi (von Martens, 1897) (Figs. 1, 7, 8, 9, 10)

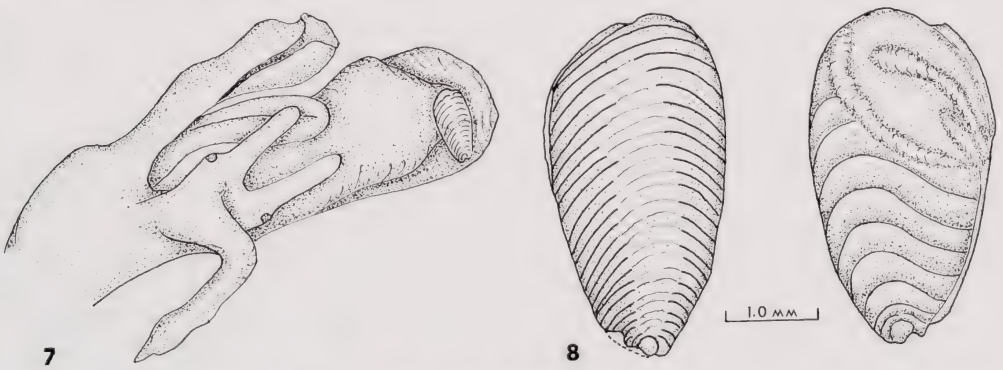
1897. *Voluta hilgendorfi* von Martens, Archiv f. Naturg., 63 (1): 176, pl. 17, fig. 1.

1920. ?*Mitra plicifera* Yokoyama, J. Coll. Sci. Imp. Univ. Tokyo, 39: 48, pl. 2, figs. 16a, b (Koshiba, L. Musashino, Miura Peninsula, L. Pliocene of Japan); 1952 Hatai & Nisiyama, Sci. Repts. Tohoku Univ. Sendai, ser. 2, Geology, Spec. vol. 3: 215; 1954 Taki & Oyama, Palaeont. Soc. Japan Spec. pap., no. 2, pl. 3, figs. 16a, b; 1972 Cernohorsky, Rec. Auckland Inst. Mus., 9: 223 (non *Mitra plicifera* S. V. Wood, 1848).

1931. *Phenacoptygma ? kiiense* Kuroda, Venus: Jap. J. Malac., 3 (1): 48, textfig. 1 (off Kii, Japan; 73.3mm).

1950. *Benthovoluta hilgendorfi* (v. Martens), Kuroda & Habe, Illust. Cat. Jap. Shells, no. 5: 37, pl. 5, fig. 2 and pl. 7, fig. 1, textfig. 4; 1952 Habe, Illust. Cat. Jap. Shells, no. 18: 132, textfig. 5; 1962 Kira, Shells west. Pacific col., 1: 92, pl. 33, fig. 3; 1963 Shikama, Select. shells world col., 1: 97, pl. 79, fig. 7; 1965 Kuroda, Venus: Jap. J. Malac., 24 (1): 50.

A specimen of *Benthovoluta hilgendorfi* collected by Th. Mortensen's Pacific Expedition (4.III.1914), 25 miles (40km) East of Zamboanga, Philippine Islands, in *c.* 450m, has been examined by the writer. This male specimen has an arched foot, tentacles and eyes, siphon, a large penis which is broad at the base, and an elongate-ovate, small, translucent corneous-yellow operculum with a terminal nucleus, size 3.7mm in a shell 87.0mm in length. The radular ribbon is 2.7mm in length and has 72 transverse



Figs. 7, 8. *Benthovoluta hilgendorfi* (von Martens). 7. Animal drawn from preserved specimen from Zamboanga, Philippine Is. ♂. 8. Dorsal and ventral view of operculum.

rows of teeth (+ 5 nascentes). The shell itself is dirty-white in colour, the aperture and columellar callus are cream and faintly suffused with brown; the antepenultimate whorl has 12 coarse axial ribs, 11-13 spiral threads on the penultimate whorl and 3 strong columellar folds of which the central one is the largest; the first posterior fold is bifurcate. The periostracum is straw-yellow, rough and mostly worn away, and viewed in profile, a shallow sutural sinus is discernible.

Rehder (1967) considered *Mitra plicifera* Yokoyama, from the Japanese Pliocene, to be a distinct species, whereas Japanese authors regard *M. plicifera* as a synonym of *Benthovoluta hilgendorfi*. The Pliocene *Mitra plicifera* does have more numerous and slender axial ribs (*c.* 20 on the spire whorls) and narrower interstices, but in view of the rather high degree of variability of sculpture in Volutacea, particularly the number and thickness of axial ribs, it is quite probable that *M. plicifera* is only a form of *Benthovoluta hilgendorfi*. Should, however, the Japanese Pliocene form be recognised as taxonomically separable, Yokoyama's *Mitra plicifera* will require a new name since it is a primary homonym of *Mitra plicifera* S. V. Wood, 1848, a vexillid from the coralline crag, Pliocene of England.

Benthovoluta meekiana (Dall, 1889) (Fig. 2)

1889. *Fasciolaria (Mesorhytis) meekiana* Dall, Bull. Mus. Comp. Zool. Harvard, 18: 172, pl. 36, fig. 7 (off Morro Light, Cuba, 250-400 fathoms (458-732m); 15.5 × 5.0 × 9.0mm); 1889 Dall, Bull. U.S. Nat. Mus., 37: 112, pl. 36, fig. 7.

1971. *Teramachia meekiana* (Dall), Bayer, Bull. Mar. Sci., 21 (1): 197, fig. 54 left and fig. 55D, E (off S.W. coast of Jamaica, Caribbean, 530-549m; 26.0 × 8.2mm).

Bayer (1971) recorded freshly dredged specimens from Jamaica and published figures of the radula. His location of *B. meekiana* and *B. chaunax* in the volutid genus *Teramachia* is, however, incorrect. Habe (1952) published figures of the radula of *Teramachia tibiaeformis* Kuroda, 1931, the type species of *Teramachia* Kuroda. The radula of that species is typically calliotectine volutid with only a single tricuspid rachidian per row and no laterals. Species of *Teramachia,* apart from their quite distinct radula, have shells sculptured with numerous, slender and sinuous axial ribs and obsolete spiral sculpture, and most important of all, channelled or indented sutures and a plaitless columella. The outer lip in *Teramachia* is basally constricted and the operculum is very large in contrast to the minute operculum of *Benthovoluta.*

Benthovoluta chaunax (Bayer, 1971)

1971. *Teramachia chaunax* Bayer, Bull. Mar. Sci., 21 (1): 198, fig. 54 right and figs. 55B, C (W. of St. Lucia, Caribbean, 201-589m; 28.0 × 8.4mm).

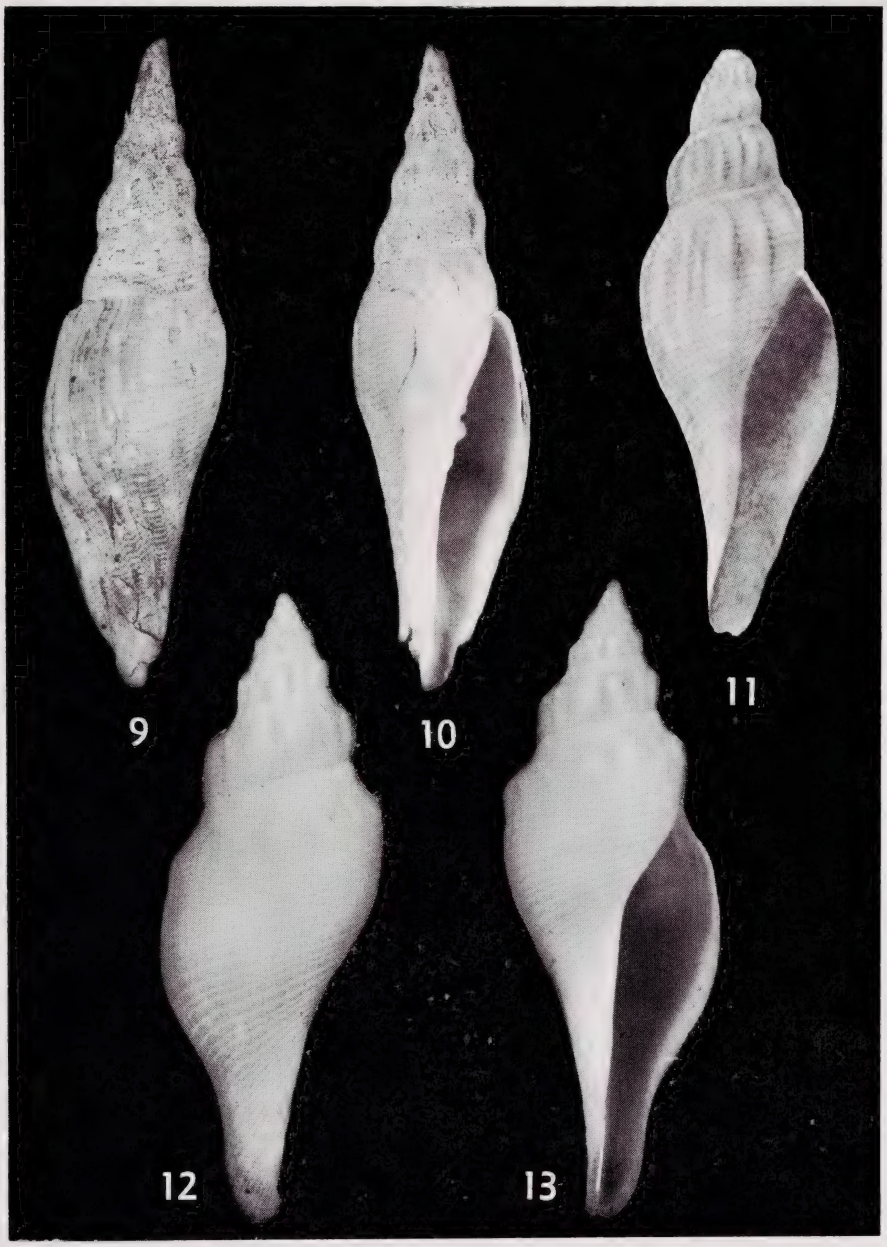
The species is similar to *Benthovoluta meekiana,* but the axial ribs are more prominent and persist to the body whorl. The radula as figured by Bayer (1971) is the most divergent among the Ptychatractinae: the rachidians have also an excavated base but have 6-7 cusps instead of the usual 3 cusps; the laterals are similar to those in *B. meekiana*, i.e. unicuspid and sickle-shaped.

Benthovoluta barthelowi (Bartsch, 1942)

1942. *Prodallia barthelowi* Bartsch, Nautilus, 56 (1): 12, pl. 2, fig. 2 (off Cagayan I, Jolo Sea, Philippine Is, 495 fathoms (906m); 27.3 × 8.3 × 5.8mm).

1970. *Teramachia barthelowi* (Bartsch), Weaver & du Pont, Living Volutes, p. 177, pl. 75, figs. C, D; 1971 Bayer, Bull. Mar. Sci., 21 (1): 196.

Weaver & du Pont (1970) described the species as having a plaitless columella and assigned it accordingly to the volutid genus *Teramachia*. *Benthovoluta barthelowi* has, however, 3 low and deep set columellar folds and closely resembles other species in this group, e.g. *B. meekiana* and *B. chaunax*. The radular anatomy of the species is still unknown and the placement in *Benthovoluta* requires confirmation.



Figs. 9-13. 9, 10. *Benthovoluta hilgendorfi* (von Martens). Off Zamboanga, Philippine Is, 450m; 87.0mm. 11. *Surculina cortezi* (Dall) (from Oldroyd 1927, pl. 13, fig. 7). 12, 13. Holotype of *Surculina expeditionis* (Dell). Chatham Rise, New Zealand, 260 fathoms (476m); 27.0mm, in Dominion Museum.

Benthovoluta costata (Dall, 1890)

1890. *Mesorhytis costatus* Dall, Proc. U.S. Nat. Mus., 12: 317, pl. 5, fig. 5 (Sth. of St. Kitts, Caribbean, 687 fathoms (1257m); 14.0 × 4.0mm).

The radula of this species is unknown and the type specimen appears to be immature; the columella has 3 folds. The species is placed in *Benthovoluta* on similarity of shell features with other species of the group.

Benthovoluta gracilior Rehder, 1967

1967. *Benthovoluta gracilior* Rehder, Pacific Science, 21: 185, textfigs. 5, 6 (off Cagayan, Nth. Sulu Sea, 508 fathoms (930m); 54.75 × 13.4mm).

This recently described species is the most turrid-like *Benthovoluta* on record; the outer lip is constricted and forms a long and narrow canal and the columella has 2 folds. The radula is unknown and the assignment to *Benthovoluta* requires confirmation.

Genus **Surculina** Dall, 1908

Surculina Dall, 1908, Bull. Mus. Comp. Zool. Harvard, 43 (6): 260. Type species by OD *S. blanda* Dall, 1908 (as *Daphnella (Surculina) blanda* on p. 291).

1918. *Phenacoptygma* Dall, Proc. Biol. Soc. Washington, 31: 138. Type species by OD *Daphnella (Surculina) cortezi* Dall, 1908.

1956. *Chathamidia* Dell, Dominion Mus. Bull., no. 18: 118. Type species by OD *C. expeditionis* Dell, 1956.

Species of the genus are similar in appearance to *Benthovoluta* but the columella is plaitless and according to Dall (1908) the animal lacks eyes, tentacles and an operculum. The radula has arched and tricuspid rachidians and the laterals are simple, unicuspid and sickle-shaped. Species range in size from 20.0 to 43.0mm. The type specimens of the 3 West American species have been illustrated by Rehder (1967).

Surculina blanda (Dall, 1908)

1908. *Daphnella (Surculina) blanda* Dall, Bull. Mus. Comp. Zool. Harvard, 43 (6): 291, pl. 3, fig. 1 (off Cocos I., Gulf of Panama, 1067 fathoms (1953m); 26.5 × 8.0 × 16.5mm).

1966. *Surculina blanda* Dall, Powell, Bull. Auckland Inst. Mus., no. 5: 137, pl. 22, fig. 7; 1967 Rehder, Pacific Science, 21 (2): 184, textfig. 7.

This species, like all other *Surculina* species, has adpressed sutures and convex whorls, but the axial ribs are usually lacking on the last 2 whorls.

Surculina cortezi (Dall, 1908) (Figs. 4, 11)

1908. *Daphnella (Surculina) cortezi* Dall, Bull. Mus. Comp. Zool. Harvard, 43 (6): 292 (off Cortez Bank, 984 fathoms (1801m); off San Diego, California, 639 fathoms (1169m); 39.0-43.0mm × 14.0 × 24.0-27.0mm).

1918. *Phenacoptygma cortezi* Dall, Proc. Biol. Soc. Washington, 31: 138; 1927 Oldroyd, Mar. shells w. coast Nth. America, 2 (1): 168, pl. 13, fig. 7.

1966. *Surculina cortezi* (Dall), Powell,, Bull. Auckland Inst. Mus., no. 5: 137; 1967 Rehder, Pacific Science, 21: 184, textfig. 8, 10 (radula).

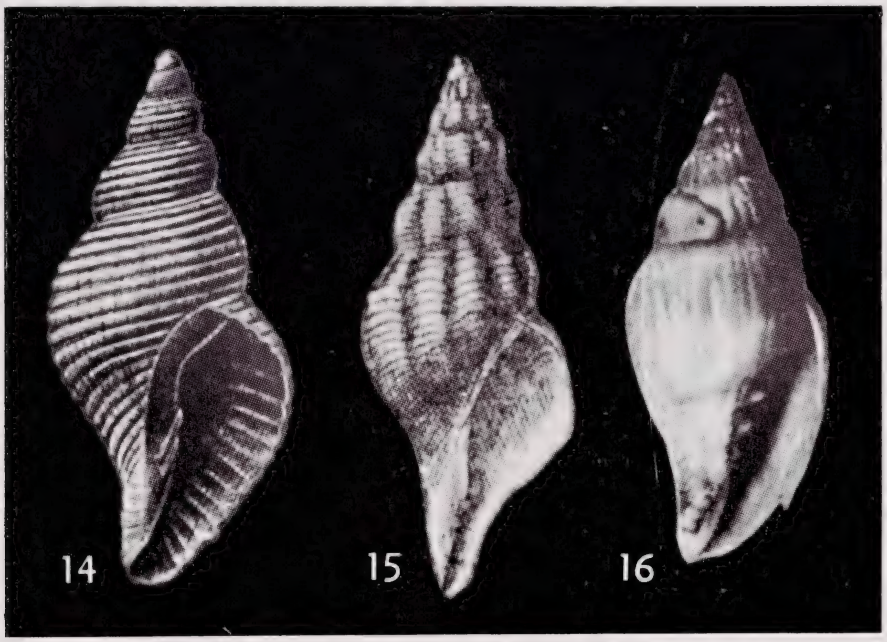
This second west American species is very similar to *S. blanda* but the axial ribs persist to the periphery of the body whorl.

Surculina galapagana (Dall, 1919)

1919. ?*Leucosyrinx galapagana* Dall, Proc. U.S. Nat. Mus., 56: 5, pl. 3, fig. 2 (off the Galapagos Is, 634 fathoms (1160m); 20.0 × 7.0mm).

1967. *Surculina galapagana* (Dall), Rehder, Pacific Science, 21: 184, textfig. 9.

This species has more pronounced turbinellid shell characters than the other 3 *Surculina* species; the whorls are more inflated and subangulate on the presutural ramp.



Figs. 14-16. 14. *Ptychatractus occidentalis* Stearns (from Dall 1921, pl. 6, fig. 8). 15. *Metzgeria alba* (Jeffreys in Thomson) (from Tryon 1881, pl. 39, fig. 191). 16. *Ceratoxancus teramachii* Kuroda. Off Tosa, Japan; 32.3mm (from Sakurai 1957, p. 162, fig. 4).

Surculina expeditionis (Dell, 1965) (Figs. 5, 12, 13)

1956. *Chathamidia expeditionis* Dell, Dominion Mus. Bull., no. 18: 118, pl. 16, figs. 159, 160 and fig. B15 (Chatham Rise, New Zealand, 220-290 fathoms (403-531m); 27.0 × 9.4 × 17.3mm).

The species, which was originally placed in the family Muricidae, closely resembles the West American *Surculina cortezi* (Dall), and undoubtedly belongs to the genus *Surculina*. It is an elongate-fusiform species, with a sculpture of angulate axial ribs which cease on the periphery of the body whorl, narrow spiral cords which flatten out on the body whorl, a smooth, plaitless columella and an elongate, spout-shaped siphonal canal. The radula as figured by Dell (1956) shows the species to be turbinellid.

Genus **Ceratoxancus** Kuroda, 1952

Ceratoxancus Kuroda, 1952, Publ. Seto Mar. Biol. Lab., 2 (2): 69. Type species by OD *C. teramachii* Kuroda, 1952.

Species of the genus are mitriform in appearance, moderate in size, of length 30.0-40.0mm, elongate-ovate to fusiform, and sculptured with numerous, slender axial

ribs and spiral threads. The columella has 3 folds, the outer lip is thin and convex in profile and the siphonal canal is moderately short. The radula is unknown and it is not known whether *Ceratoxancus* is operculate. The 2 species recorded in the genus are known only from Japan.

Ceratoxancus teramachii Kuroda, 1952 (Fig. 16)

1952. *Ceratoxancus teramachii* Kuroda, Publ. Seto Mar. Biol. Lab., 2 (2): 69, textfigs. 1-4; 1957 Sakurai, Venus: Jap. J. Malac., 19: 162, textfigs. 3, 4 (off Tosa, Japan).

The species is short, squat and mitriform, and bears a strong resemblance to Eocene-Miocene species of the volumitrid genus *Conomitra* Conrad; the columella has 3 well-spaced folds.

Ceratoxancus elongatus Sakurai, 1957

1957. *Ceratoxancus elongatus* Sakurai, Venus: Jap. J. Malac., 19: 161, textfigs. 1, 2 (off Tosa, Shikoku I, Japan, dredged in deep water; 40.85 × 14.9 × 23.2mm).

The species is more fusiform and elongate than *C. teramachii* and the sculpture is finely granulose.

Acknowledgements. I am grateful to Dr J. Knudsen, University Zoological Museum, Copenhagen, for the Indo-Pacific volutacean molluscs received for identification, and to Dr F. Climo, Dominion Museum, Wellington, for the loan of the holotype of *Surculina expeditionis* (Dell).

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DESCRIPTION OF NEW WEST AUSTRALIAN MITRIDAE AND VEXILLIDAE (MOLLUSCA: GASTROPODA)

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AUCKLAND INSTITUTE AND MUSEUM

Abstract. Two new species of Vexillidae and one new species and a subspecies of Mitridae from Western Australia are described as new to science.

Family MITRIDAE Swainson, 1831

Subfamily IMBRICARIINAE Troschel, 1867

Genus **Scabricola** Swainson, 1840

Scabricola Swainson, 1840, Treat. Malacology, pp. 130, 131, 319. Type species by SD (Gray, 1847) *Mitra serpentina* Lamarck, 1811 = *Voluta variegata* Gmelin, 1791. Recent, Indo-Pacific.

Subgenus **Scabricola** Swainson, 1840

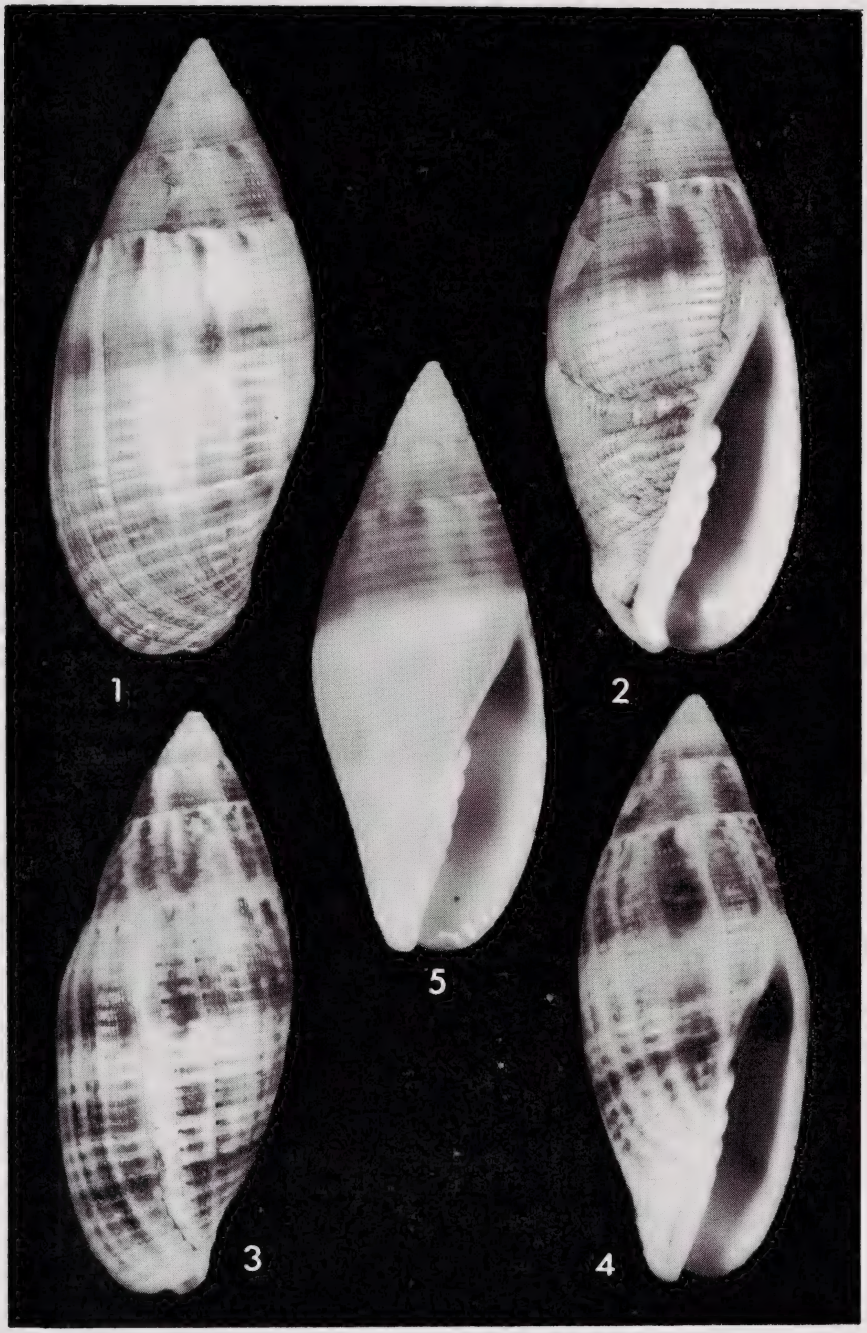
Scabricola (Scabricola) backae, sp. n. (Figs. 1-5)

Shell moderately small, 20.0-26.0mm in length, elongate-ovate, moderately solid. White to greyish-white in colour, ornamented with nebulous brown streaks on spire whorls and 2-3 narrow or moderately broad brown bands on body whorl; the brown bands occasionally broken up into axial streaks, the sutures having irregularly spaced and more saturated small brown spots. Teleoconch of $4\frac{3}{4}$-$5\frac{1}{2}$ whorls, first two post-nuclear whorls convex, later whorls almost flat-sided, partly preserved protoconch consisting of $1\frac{1}{2}$ + smooth, white nuclear whorls. First post-nuclear whorl sculptured with 5-7 minutely pitted spiral grooves, penultimate whorl with 6-8 grooves and body whorl with 14-20 grooves, apart from up to a dozen oblique cords towards base of body whorl; the spiral grooves bisected by numerous, close-set axial lirae rendering the grooves pitted. Spiral grooves either broad or narrow giving rise to broad or narrow, angulate spiral threads which appear stepped in profile; sutures narrowly incised and irregularly crenate by the intruding axial lirae. Aperture longer than spire, narrow, smooth and porcellaneous-white within; outer lip regularly convex and minutely but bluntly crenulate on the moderately thickened margin. Columella calloused, white, and with 5 strong, oblique folds which decrease in size anteriorly; in some adult specimens anterior end of columellar callus terminating in a small point recurving towards aperture. Siphonal canal short, siphonal notch distinct, siphonal fasciole corded and calloused in adult individuals.

TYPE LOCALITY. Flinders Bay, Augusta, southwest Australia, intertidal.

KNOWN RANGE. From Onslow to Flinders Bay, Augusta.

Holotype. In the Western Australian Museum, Perth, No. 14-72; length 22.6mm, width 9.5mm, height of aperture 14.8mm, *leg.* F. Back, January 1972 (Figs. 1, 2).
Paratypes. Flinders Bay, Augusta: No. 233-70a-b, 26.2 × 9.8 × 15.7mm and 24.2 × 9.7 × 15.4mm; No. 14-72a, 20.0 × 8.0 × 12.9mm (Fig. 5) (all specimens in WAM); 23.1 × 9.0 × 15.2mm and 22.8 × 9.4 × 15.0mm in H. Eker coll.; 22.0 × 9.0 × 14.6mm in author's coll. S. end of Garden I: No. 472-72, 21.2 × 8.0 × 12.7mm in WAM. Onslow: 25.0 × 10.0 × 16.0mm in M. Marrow coll. (Figs. 3, 4); 22.1 × 19.3 × 14.6mm in F. Haddrill coll.



Figs. 1-5. *Scabricola (Scabricola) backae* sp. n. 1, 2. Holotype WAM No. 14-72; Flinders Bay, Augusta, S.W. Australia; length 22.6mm (broad form). 3, 4. Paratype from Onslow, West Australia; coll. M. Marrow; length 25.0mm (slender form). 5. Paratype WAM No. 14-72a; Flinders Bay, Augusta, S.W. Australia; length 20.0mm (juvenile specimen).

Scabricola backae is the only species in the genus which extends from tropical waters to warm temperate waters (*c.* 16°C) of the southwest Australian tropic-temperate faunal transition zone. The species can be compared with *Scabricola desetangsii* (Kiener, 1838) from the tropical Indo-Pacific but it lacks this species prominent spiral cords, gemmate spire-whorl sculpture, shorter spire and narrower aperture. *S. backae* is perhaps nearest to *Mitra hayashii* Kira, 1959, from Japan, but this species is more slender and pterygine in form, the spire is shorter, the aperture more narrow and fusiform and the sculpture is finer with more numerous and close-set spiral grooves. *Scabricola barrywilsoni* (J. Cate, 1968), which ranges from Onslow, West Australia, to Darwin, Northern Territory, differs in form, formation of whorls, sculpture and colour-pattern, and is here illustrated for comparison (Figs. 6, 7).

The species is named for Mrs Fay Back who first collected this species at Augusta.

Subgenus **Swainsonia** H. & A. Adams, 1853

Swainsonia H. & A. Adams, 1853, Gen. Rec. Mollusca, 1: 180. Type species (art. 67i of ICZN) *Mitra fissurata* Lamarck, 1811. Recent, Indo-Pacific.

Scabricola (Swainsonia) ocellata ekerae subsp. n. (Figs. 8 - 12)

Shell moderate in size, 27.0-38.0mm in length, fusiformly-elongate or occasionally elongate-cylindrical, solid. Fawn to light grey in colour, body whorl from periphery to base green or brownish-green; columella and folds greyish, edge of outer lip and tip of siphonal canal orange-brown or purple-brown, interior of aperture greenish. Whorls 7-9, convex at the shoulder, protoconch with 1½-2 conical, glassy-brown nuclear whorls. First 3-4 post-nuclear whorls with 3 spiral rows of small punctures, penultimate whorl and sutural area of body whorl with 5-8 wide-spaced, finely incised and minutely punctate spiral grooves. Axial sculpture consisting of close-set, numerous and slender axial riblets continuing to presutural area of body whorl and ceasing abruptly at periphery. Aperture narrow, longer than spire, smooth within, outer lip descending almost vertically and forming a rounded point basally; columella glazed or prominently calloused, the 5-6 columellar folds prominent, close-set, parallel and set very low on the columella almost reaching the tip of the siphonal canal and extending partly over the siphonal fasciole. Siphonal canal short, straight and pointed, siphonal notch deep.

Radular ribbon 4.2mm in length, typically *Scabricola* type, formula 1 + 1 + 1, with 59 transverse rows of teeth (+ 2 nascentes). Rachidians narrowly triangular, with 8 slender and deeply rooted cusps which decrease in size towards the base. Lateral teeth slightly larger than rachidians, equipped with 5 inward facing cusps on an angular plate, last half of lateral white and thin (Fig. 12).

TYPE LOCALITY. Southwest of Point Cloates, West Australia, Lat. 113°39′30″ E, Long. 22°43′30″ S.

KNOWN RANGE. From Point Cloates to the Dampier Archipelago.

HABITAT. On sand and algae covered bottom, from the intertidal zone to a depth of 23 fathoms (42m).

Holotype. In the Western Australian Museum, Perth, No. 5014-68; length 37.0mm, width 11.0mm, height of aperture 22.4mm, Ningaloo Expedition, 7. 9. 1968 (Figs. 8, 9). *Paratypes.* Point Cloates: 37.4 × 11.4 × 21.7mm; 35.9 × 10.7 × 21.7mm; 33.8 × 10.2 × 20.8mm; 30.6 × 9.8 × 19.4mm; 29.8 × 9.8 × 19.4mm (Figs. 10, 11) (all spec. in

Figs. 6-11. 6, 7. *Scabricola (Scabricola) barrywilsoni* (J. Cate, 1968); N. of Port Hedland, West Australia; length 23.8mm. 8-11. *Scabricola (Swainsonia) ocellata ekerae* subsp. n. S.W. of Point Cloates, West Australia. 8, 9. Holotype WAM No. 5014-68; length 37.0mm. 10, 11. Paratype WAM No. 5014-68a; length 29.8mm.

WAM); 33.0 × 10.0 × 20.8mm (in author's coll.). N. Muiron I: 34.0 × 10.8 × 23.0mm; 27.5 × 9.1 × 16.8mm (in M. Marrow coll.). W. of Flat I, near Onslow: (specimens in WAM). 20 miles (32km) N. of Delambre I, Dampier Archipelago, 23 fathoms (42m) (specimens in WAM).

Scabricola (Swainsonia) ocellata ekerae is a geographically segregated subspecies which is morphologically separable from the nominate species *S. (S.) ocellata ocellata* (Swainson, 1831). *S. (S.) ocellata* and its two small forms *Mitra incisa* Adams & Reeve, 1850, and *M. mariae* A. Adams, 1853, always have 3-4 angulate spiral cords on the penultimate whorl and the presutural area of the body whorl, and not two constricted grooves. *S. (S.) ocellata ekerae* lacks the white hair-line pattern and 2 rows of small brown and white spots bordering the dark greenish band on the body whorl. In *S. (S.) ocellata ocellata* the axial sculpture consists of short axial lirae which are confined to the interstices of the angulate cords, whereas in the subspecies *ekerae* the axial riblets are slender, close-set and continuous.

The species is named for Miss Helene Eker, a keen student of the family Mitridae.

Fig. 12. Half-row of radula of *Scabricola (Swainsonia) ocellata ekerae* subsp. n. S.W. of Point Cloates, West Australia, ♂.

Family VEXILLIDAE Thiele, 1929

Ponder (1972) published the results of anatomical studies of species of Mitridae and Vexillidae and the findings necessitate an elevation of the mitrid Vexillinae to family rank. Ponder found pronounced differences in the structure of the pedal gland, renal organ, accessory salivary glands, gland of Leiblein and the gonads, which lend support to a familial separation of the two groups. Although Ponder stated that an epiproboscis (formerly "venom-gland") is absent in the Vexillidae, this organ has been observed in the vexillid genus *Thala* H. & A. Adams, during an experiment arranged by Mrs V. Orr Maes at the Academy of Natural Sciences, Philadelphia.

Genus **Vexillum** Röding, 1798

Subgenus **Pusia** Swainson, 1840

Pusia Swainson, 1840, Treat. Malacology, p. 320. Type species by M *P. microzonis* (Lamarck) = *Mitra microzonias* Lamarck, 1811. Recent, Indo-Pacific.

Vexillum (Pusia) hansenae sp. n. (Figs. 13-16)

Shell small, 6.0-21.0mm in length, variable in form, ovate to fusiformly- elongate, solid. Base colour bluish-white to steel-grey, spire whorls ornamented at sutures with a turret-like, dark olive-green narrow band which appears as small quadrate spots at the sutures; lower two-thirds of body whorl dark olive-green, interrupted in places by narrow, interrupted bluish-white bands of the protruding base colour. At periphery, the dark olive-green zone with a turret-like border; aperture greenish-brown and occasionally cream-banded, columellar folds white or grey, parietal wall dark olive-green. Teleoconch of 4-6 convex whorls, protoconch of 1-1½ smooth and slightly globose nuclear whorls; sculptured with broad, irregular, ill-developed flattish axial folds numbering 12-21 on penultimate whorl and 2-15 on body whorl. Spiral sculpture not visible to the naked eye, base of body whorl with 6-14 oblique spiral cords; sutures narrowly incised. Aperture narrow, equal in height or slightly longer than spire, lirate within, lirae occasionally obsolete, outer lip moderately thickened, simple and regularly convex; columella only thinly glazed and with 4 prominent, oblique folds decreasing in size towards the anterior. Siphonal canal short and straight, siphonal notch moderately shallow.

TYPE LOCALITY. Sarge Bay, Augusta, southwest Australia, intertidal.

KNOWN RANGE. From Busselton to Cape Riche, southwest Australia.

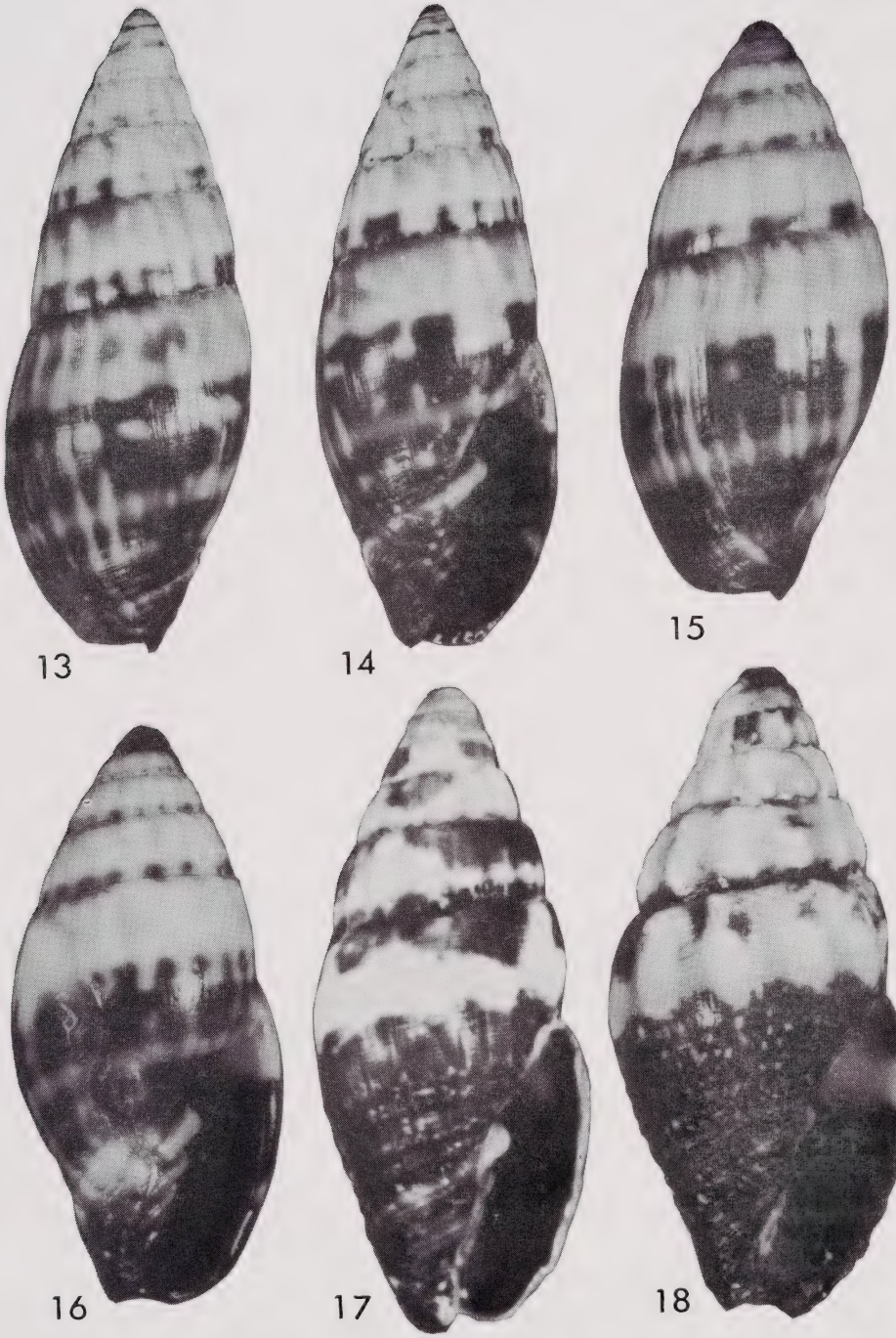
HABITAT. On reefs, in rock-pools and under rocks, intertidal.

Holotype. In the Western Australian Museum No. 13-72; length 14.6mm, width 5.5mm, height of aperture 7.2mm, *leg.* G. Hansen, 26.5.1971 (Figs. 13, 14).

Paratypes. Total of 27 specimens examined. Paratypes are in the Western Australian Museum, coll. M. Marrow, coll. G. Hansen, coll. F. Haddrill, coll. H. Eker and the author's coll. 2 miles (3.2km) N.W. of Busselton: 11.5 × 4.5 × 6.2mm (WAM); Margaret River: 8.9 × 4.1 × 5.4mm (2 spec. in M. Marrow coll.); Sarge Bay, Augusta: 20.5 × 7.2 × 9.5mm; 9.5 × 4.2 × 5.6mm (Figs. 15, 16) (6 spec. in WAM, 3 spec. coll. H. Eker and 2 spec. in coll. G. Hansen); Two Peoples Bay: 13.5 × 5.1 × 6.9mm (1 spec. coll. M. Marrow and 1 spec. coll. F. Haddrill); Cape Riche: 10.8 × 4.7 × 5.9mm (10 spec. in coll. M. Marrow and 1 spec. in author's coll.).

The species superficially resembles *Vexillum (Pusia) microzonias* (Lamarck, 1811) which also occurs in Western Australia, but this species has more distinctly incised sutures, axial ribs instead of flat folds, prominent spiral striae, a wider aperture, different colour pattern and has the lower half of the body whorl sculptured with prominently nodulose cords (Figs. 17, 18).

The species is named for Mrs G. Hansen, who collected the species at Augusta.



Figs. 13-18. 13-16. *Vexillum (Pusia) hansenae* sp. n. Sarge Bay, Augusta, S.W. Australia. 13, 14. Holotype WAM No. 13-72; length 14.6mm (slender form). 15, 16. Paratype WAM No. 13-72a; length 9.5mm (broad form). 17, 18. *V. (P.) microzonias* (Lamarck, 1811). 17. Port Hedland, West Australia; WAM No. 153-70; length 16.2mm. 18. Sculptural variant, Airport beach, Barrow I, West Australia; WAM No. 2515-67; length 14.0mm.

Vexillum (Pusia) marrowi sp. n. (Figs. 19-23)

1966. *Proximitra pica* (Reeve), Hodgkin, Kendrick, Marsh and Slack-Smith, West. Australian Nat. Club Handb., no. 9: 47, pl. 18, fig. 4 (*non Mitra pica* Deshayes & Edwards, 1844; *nec* Reeve, 1845).

Shell small, 7.0-21.0mm in length, generally ovate or occasionally elongate-ovate, solid. Brown to purplish-brown in colour, ornamented with an irregular white presutural transverse band and small or large white flecks; aperture brown near edge of outer lip and violet or purplish within, parietal wall brown, columellar folds bluish-white or violet. Teleoconch of 4-6 short, convex whorls, protoconch of $1\frac{1}{2}$-$2\frac{1}{2}$ smooth nuclear whorls; sutures sharply incised and distinct. Sculptured with slender and occasionally angulate axial ribs numbering 15-28 on penultimate and 1-20 on body whorl; slender and often flattened and irregular spiral striae encircle whorls, numbering 5-14 on penultimate and 8-17 on body whorl, apart from 7-13 oblique basal cords. Interstices of spiral cords minutely punctate giving the impression of being finely striate. Aperture longer than spire, moderately wide and lirate within, outer lip convex and constricted anteriorly; parietal wall glazed, lower half of columella calloused and with 4 distinct, oblique folds. Siphonal canal straight and short, siphonal notch distinct but moderately shallow.

TYPE LOCALITY. Yanchep reef, *c.* 30 miles (*c.* 48km) north of Perth, West Australia.

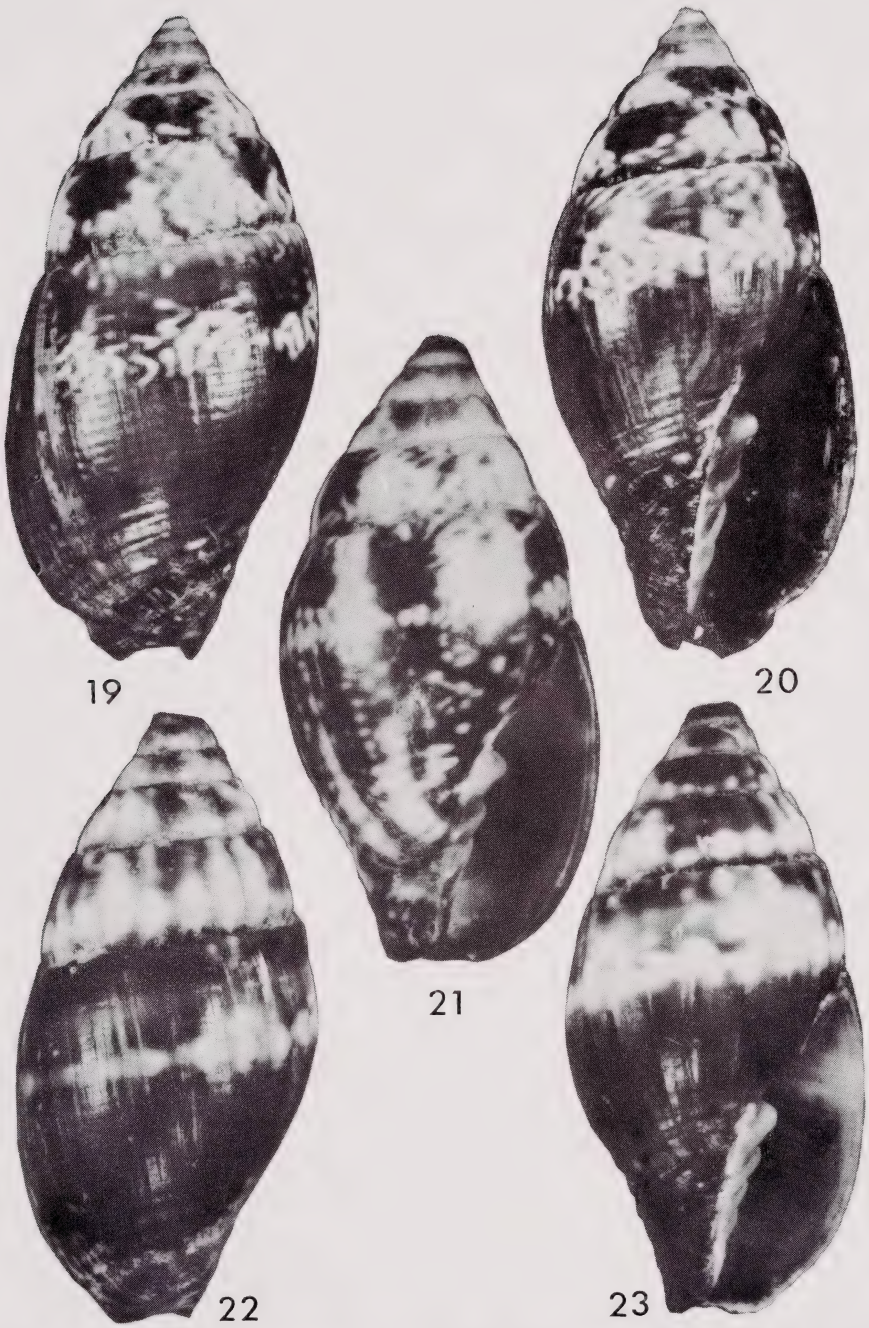
KNOWN RANGE. From Port Gregory to Margaret River, S. of Cape Naturaliste, southwest Australia.

HABITAT. Under rocks and in rock-pools, from the intertidal zone to a depth of 13 fathoms (24m).

Holotype. In the Western Australian Museum No. 408; length 12.9mm, width 6.2mm, height of aperture 7.8mm (Figs. 19, 20).

Paratypes. 89 specimens examined. Paratypes are in the Western Australian Museum, coll. M. Marrow, coll. H. Eker, coll. T. Whitehead and the author's collection. Port Gregory: 21.2 × 9.6 × 11.7mm (2 spec. in WAM); East Wallaby I, Houtman Albrolhos Archipelago: (1 spec. in WAM); Zeewyck Channel, Houtman Abrolhos Archipelago: 16.9 × 7.4 × 9.0mm (1 spec. in WAM); Horrocks Beach: (1 spec. in M. Marrow coll.); Port Dennison reef, 15 miles (24km) S.W. of Dongara: (1 spec. in WAM); Yanchep reef: (2 spec. in WAM); Sorrento Beach, N. of Perth: (6 spec. in M. Marrow coll.); North Beach, Perth: 11.5 × 5.8 × 6.9mm (Fig. 21) (8 spec. in WAM; 1 spec. in author's coll.); South Cottesloe Beach, Perth: (1 spec. in author's coll.); Woodman's Point, Coburn Sound: (3 spec. in WAM); Lady Adeline Bay, Rottnest I: 6.9 × 4.2 × 4.6mm (48 spec. in WAM; 4 spec. in M. Marrow coll.; 1 spec. in author's coll.); Shoalwater Bay, via Rockingham: (1 spec. in WAM); 2 miles (3.2km) N.W. of Busselton jetty, 12-13 fathoms (22-24m): 11.4 × 5.5 × 6.8mm (Figs. 22, 23) (2 spec. in WAM); Bunker Bay: (1 spec. in WAM); Margaret River: (4 spec. in H. Eker coll.).

This common intertidal species has been confused with *Mitra pica* Reeve, 1845 (non Deshayes & Edwards, 1844), which is *Waimatea obscura* (Hutton, 1873), an operculate species belonging to the family Volutomitridae. It has also been occasionally labelled *Mitra alveolus* Reeve, 1845, which is an indeterminable species whose type has been sold at auction. *Vexillum (Pusia) marrowi* is superficially similar to *V. (P.) hansenae,* but is broader and more ovate and has narrow, angulate axial ribs instead of flat folds and a spiral sculpture with pitted interstices, a feature lacking in *V. (P.) hansenae.*



Figs. 19-23. *Vexillum (Pusia) marrowi* sp. n. 19, 20. Holotype WAM No. 408; Yanchep reef, West Australia; length 12.9mm. 21. Paratype WAM No. 151-70; North Beach, Perth; length 11.5mm. 22, 23. Paratype WAM No. N-3569; 2 miles (3.2km) N.W. of Busselton jetty, 12-13 fathoms (22-24m); length 11.4mm (axially ribbed on body whorl).

The species is also similar to *V. (P.) microzonias* (Lamarck, 1811) and its sculptural forms (Figs. 17, 18), but this species is more elongate-ovate, the body whorl is considerably shorter, the spiral sculpture more prominent, and the lower half of the body whorl has distinctly granulose spiral cords.

The species is named for Mr M. Marrow, who collected the species at various West Australian localities.

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A LIST AND BIBLIOGRAPHY OF THE AQUATIC AND WATER-ASSOCIATED INSECTS OF NEW ZEALAND

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Abstract. A list of the New Zealand aquatic, semi-aquatic, and some closely associated insects, follows a general introduction and discussion by insect orders. A bibliography covering the past twenty years is given.

The previous list of aquatic and semi-aquatic insects of New Zealand (Wise 1965) was in the nature of a preliminary list. Since that list was prepared there have been many changes in classification and additions to the knowledge of the fauna, and the intention in the present list is to indicate up-to-date classification and to present a better picture of the possible extent of the aquatic and water-associated insect fauna.

Because of lack of knowledge of the association of Collembola and water surfaces, this group, which is now considered by me as a separate class of the superclass Hexapoda, and which was represented by only a few species in the earlier list, is not included here. The present list is consequently restricted to the class Insecta *(sensu stricto)*. General classification follows that in the recent textbook "The insects of Australia" (Division of Entomology, C.S.I.R.O. Australia, 1970) but classification differs within some orders.

The full list of references given here constitutes a bibliography covering the past twenty years, continuing from Miller's "Bibliography of New Zealand Entomology" (1956) which covered the period up to 1952. Many of the works referred to for one group of insects also contain information on other groups.

General information on the aquatic and water-associated insects of New Zealand is included in such publications as Marples (1962), Pendergrast & Cowley (1966), Stout (1969a, 1969b), Dumbleton (1970b), Miller (1971) and Sharell (1971). Wise (1956) and Winterbourn (1964b) have examined the fauna of Little Barrier I., Watson (1972) the lotic fauna of Red Mercury I., and the faunas of the subantarctic islands south of New Zealand have been discussed by Brundin (1962, 1966), Illies (1963a, 1964b), Wise (1964, 1972), Gressitt, Rennell & Wise (1964), Gressitt & Wise (1971) and Peters (1971). Pond and lake faunas have been treated in such papers as Cunningham et al (1953), Byars (1960), Barclay (1964), Barker (1966) and Stout (1969a); river and stream faunas in such as Allen (1959), McLean (1966) and Stout (1969b). Faunas of polluted waters have been discussed by Hirsch (1958), of thermal waters by Winterbourn & Brown (1967), Winterbourn (1968b, 1969, 1970, 1973a, 1973b), Dumbleton (1969b), Brock & Brock (1971), of mineralised waters by Bayly (1967), Dumbleton (1969b). Aquatic faunas associated with trout and other fishes have been examined by Percival (1932), Allen (1951, 1952) and Hopkins (1965, 1970). Hopkins, Brewerton & McGrath (1966) and Dacre & Scott (1973) investigated the effects of agricultural insecticides on stream faunas, and Burnet (1973) the effects of a weedicide. May (1963) recorded aquatic species in caves, Brundin (1966) and Dumbleton (1973a) in glacial waters and Marshall (1973) in cold spring waters. Rearing techniques were described by Craig (1966), Forsyth (1968), and survey methods by Spiller (1965).

Rec. Auckland Inst. Mus. 10: 143-187 December 17th, 1973

The classification used here for the Ephemeroptera is based on that of Edmunds (Edmunds, Allen & Peters 1963, Edmunds 1972), not of Demoulin (1969). Recent additions to knowledge of the mayfly fauna have been made by Penniket (1961, 1962a, 1962b, 1966b, 1969), Wisely (1961, 1962, 1965), McLean (1966, 1967a, 1967b, 1970), and Peters (1971).

In the Odonata, the modified Fraser (1957) classification used by O'Farrell (1970) is followed. Although this list is not intended for taxonomic change the use of this classification places the one lestid species in an anomalous position as Lieftinck (1960) used the combination *Lestes (Indolestes) colensonis;* a combination incorrectly listed by Wise (1965) and Penniket (1966a) in the family Sympecmatidae. The species is sympecmatine, however, and the older Tillyard combination *Austrolestes colensonis* (e.g. Fraser 1960), as still commonly used (Pendergrast & Cowley 1966), Winterbourn 1968, Stout 1969a, 1969b, Scott 1971, Miller 1971) is accepted here. Wolfe (1953) studied one genus, Armstrong (1958a, 1958b, 1958c) has recorded several occurrences, and Wise (1962) and Scott (1971) have written on immatures.

Illies (1960, 1961a, 1961b, 1962, 1963a, 1964a, 1964b, 1965, 1969), McLellan (1965, 1966, 1967, 1968, 1969, 1973, McLellan & Winterbourn 1968) and Winterbourn (1965, 1966, 1968a) have added greatly to our knowledge of the Plecoptera in recent years and classifications used by them are used here. So-called terrestrial (Wisely 1953) or semi-terrestrial (Illies 1963a, 1964b) species included previously (Wise 1965) are again included as this is essentially an aquatic order and the species concerned occur in wet places; mites have been recorded from one of these species (Wisely 1953, Womersley 1953). In a little-known paper, Sámal (1921) recorded four species of Plecoptera from New Zealand but three must have been specifically or generically mis-identified as the genera are not otherwise recorded in New Zealand. Of these three, *Gripoteryx cancellata* (Pictet, 1841) (Sámal 1921, 18 (3, 4): 67) was recorded as a South American species by Illies (1963b), *Pteronarcella atra* Sámal, 1921 (Sámal 1921, 18 (1, 2): 14-20, 18 (3, 4): 67-68) has recently been established as an Australian species, *Acruroperla atra* (Sámal, 1921) by Illies (1969), and *Gripopteryx zeelandica* is recorded in this list as *species dubiae;* the fourth species was *Stenoperla prasina* (Newman 1845) (Sámal 1921, 18 (3, 4): 61-64, 70) a well-known New Zealand endemic.

There are no aquatic Orthoptera in New Zealand but Edwards (1952) has recorded submergence of stream-side wetas (*Paraneonetus* sp., family Rhaphidophoridae).

In the Hemiptera: Heteroptera there are several aquatic and semi-aquatic families; classification follows that used by Woodward et al (1970). Three species have been added to the Saldidae by Cobben (1961) in a paper not noticed for the previous list. The Saldidae, though not truly semi-aquatic, are included because of their close association with water; the breeding of one species has been studied by Mason (1973). The family Gerridae is represented by one marine semi-aquatic species recorded by Myers (1921). Woodward (1954) has recorded a second species of the semi-aquatic Veliidae; Don (1967) has studied the common species. A species of the semi-aquatic Hydrometridae was recorded in New Zealand by Woodward (1952). Pendergrast (1959) recorded the family Mesoveliidae in New Zealand from the presence of one semi-aquatic and one terrestrial species, both of which are still unnamed. Young (1962) revised the aquatic Corixidae and Notonectidae.

The one dobson-fly species is now classified in the order Megaloptera (e.g. Riek 1970), not in the order Neuroptera (Wise 1963, 1965).

There are many changes and corrections in the order Coleoptera; the modified Crowson classification (Crowson 1967) is followed here. The aquatic family Dytiscidae has been revised by Ordish (1966, 1967) and Wise (1961) described some immatures. Ochs (1949) had earlier established the one recorded New Zealand gyrinid species *Gyrinus huttoni* Pascoe, 1877, as an Australian species *G. convexiusculus,* but there is no recent confirmation that this species or the family Gyrinidae occur in New Zealand. One species of Hydraenidae is known to be aquatic. There are many species of Hydrophilidae in New Zealand, but only those known to be aquatic are listed. In a paper on Hydrophilidae of thermal waters, Winterbourn (1970) recorded four species, including one unnamed species of *Paracymus.*

There has, in the past, been considerable confusion in the classification of some of the New Zealand Coleoptera families now in the Eucinetoidea and Dryopoidea. The Dascillidae in Hudson's list (1934) are mostly Helodidae and some helodid beetles are aquatic (e.g. Watson 1972), but none are specifically recorded as such. The family Dryopidae of Hudson's list (1934) includes parnines and elmids. The term "parnid" or "Parnidae" has been used for aquatic beetles and larvae (Phillips 1929, Percival 1932, Dickinson 1951, Allen 1951, 1952, 1959, Marples 1962, Hopkins 1965, Stout 1969b) but, although the family Dryopidae (*sensu* Crowson 1967) contains the group originally known as "Parnina", none of the New Zealand dryopids are known to be aquatic and some are known to be terrestrial. The family Elmidae (*sensu* Crowson 1967) (also variously known as Elminthidae, Helmidae, Helminthidae) contains the aquatic genus *Hydora,* recorded by Hudson (1934) and Wise (1965) in Dryopidae. It appears that the terms "parnid" and "Parnidae" have been used for elmids (e.g. Phillips 1929, Hopkins 1965 — "Parnidae", 1970 — "Elmidae") or even for helodids or other aquatic beetles and/or their larvae. The reason for the "parnid period" in the New Zealand literature is not apparent, as Tillyard (1926) had recorded the family as "Dryopidae (Parnidae)" and had clearly placed the parnines in Dryopidae: Dryopinae and the genus *Hydora* in Dryopidae: Helminae. Winterbourn (1964a) has correctly keyed larvae of Helodidae and Elmidae. An aquatic weevil (Curculionidae) has recently been recorded by May (1970).

One species of Mecoptera has long been known in New Zealand but the unusual aquatic habit of larvae of this species has only been discovered and recorded in recent years by Pilgrim (1969, 1970, 1972).

In the Diptera, several families are aquatic and many families contain aquatic species; the general classification here follows Colless & McAlpine (1970). Some of the Tipulidae are aquatic in freshwater and marine littoral habitats but few species are recorded. All species of the subgenus *Idioglochina* are probably marine (Alexander 1959, 1972) and the three species listed are associated with the sea shore as are the other three species of *Limonia* (Wise 1965). A few species of the New Zealand Psychodidae are aquatic; Satchell (1954) recorded *Pericoma* larvae on wet stones and the one species listed, *Psychoda alternata,* was recorded as aquatic by Miller & Watt (1915) under the name of *conspicillata.* In his work on the mosquitoes of the South Pacific and his later revision of the Culicidae of New Zealand, Belkin (1962, 1968) has placed the dixids as a subfamily of the Culicidae; Belkin's classification is used here. The two mosquito species breeding in salt water pools on the coast, *Opifex fuscus* and *Aedes chathamicus,* were discussed by Dumbleton (1962a) who has written several papers on this family (1963c, 1965, 1968, 1970a). Pillai (1966) has described a new species of Culicidae, a gynandromorph of which was discussed by Dobrotworsky (1972), has given other New Zealand records and has written on mosquito parasites (Pillai 1965,

1968a, 1968b, 1969, Pillai & MacNamara 1968, Pillai & Smith 1968); other recent authors are Marks (1958, Knight & Marks 1952, Klein & Marks 1960, Marks & Nye 1963), Nye (1962, Nye & McGregor 1964), McGregor (1963, 1965), Haeger & Provost (1965), Forsyth (1968), and Foot (1970a, 1970b). One mosquito species, *Culex annulirostris,* collected once in New Zealand (Wise 1965) is not now listed. A major work by Brundin (1966) has added considerably to our knowledge of the New Zealand Chironomidae and Forsyth (1971) has also added new species. Freeman (1959) revised the Chironomidae and later (1961) included generic changes and new records in the New Zealand chironomids. Brundin (1962) recorded *Halirytus macquariensis* and *Smittia* sp. from Macquarie I. *Chironomus* species have been discussed in relation to saline waters (Lamb 1961), warm waters (Winterbourn & Brown 1967, Winterbourn 1968b), polluted waters (Hirsch 1958, Spiller & Forsyth 1970), lake waters (Armstrong 1935, Barker 1966), and mineralised waters (Dumbleton 1969b). Fossil chironomid species, including *Dryadotanytarsus duffi* Deevey, 1955, were recorded from swamp deposits by Deevey (1955). Aquatic larvae of the family Ceratopogonidae have been collected but the species concerned are not known to the author. Dumbleton (1971) discussed the possibility that the biting ceratopogonid midge, *Styloconops myersi* (Tonnoir, 1924), is a brackish water species but had been unable to trap it in such a situation and Laurence & Mathias (1972) have since recorded a species of *Leptoconops (Styloconops)* breeding in beach sand above high tide level; the New Zealand species is consequently not listed here. Dumbleton, who has recently (1973b) revised *Austrosimulium,* the only genus of Simuliidae in New Zealand, had also published earlier on this group (Dumbleton 1953, 1962b, 1963b, 1963d, 1964, 1969a, 1970a); Miller (1969) recorded some predators of sandflies. The aquatic family Thaumaleidae (Dumbleton 1969a) contains two New Zealand species. The family Blepharoceridae has been revised and discussed by Dumbleton (1963a, 1963d, 1970a) and also by Craig (1963, 1967a, 1967b, 1969).

In the Diptera: Brachycera, some larvae of the Tabanidae occur in wet places about waterfalls, and some are aquatic (Pendergrast & Cowley 1966). Some of the Stratiomyidae are aquatic but only one species is recorded (Wise 1965). Dumbleton (1966) described aquatic larvae of two Empididae species and noted that all known larvae of the subfamilies Hemerodromiinae and Clinocerinae are aquatic; all New Zealand species of these two subfamilies are consequently listed here from Collin (1928), Miller (1950) and Smith (1964) in order to give a better representation of the aquatic fauna. In the family Syrphidae the rat-tailed maggots of *Helophilus* and *Eristalis* are recorded as aquatic by Miller (1971). Many species of the family Ephydridae are aquatic but few are recorded (Wise 1965); Winterbourn & Brown (1967), Winterbourn (1968b, 1969) and Dumbleton (1969b) have given recent records of species in thermal and mineralised waters. Some species of the family Muscidae are also aquatic, e.g. *Limnophora* spp. (Pendergrast & Cowley 1966), including some which inhabit the marine littoral zone (Wise 1965).

A revolutionary classification of Trichoptera by Ross (1967) is accepted here. *Alloecentrella* is the only doubtful genus but it is here retained close to *Pycnocentrella* now in the Pycnocentrellidae. This order was revised for New Zealand by Mosely & Kimmins (1953, Kimmins 1960) and further information has been provided by McFarlane (1956, 1960, 1964, 1966, 1969, 1973), Wise (1958, 1962, 1964, 1970, 1972), Leader (1970, 1972a, 1972b) and Michaelis (1973). It may be noted that, despite the title "Contribution à la connaissance de la faune trichoptérologique de la Tasmanie et de la Nouvelle-Zélande" and similar information in the abstract and introduction, none of the species described by Jacquemart (1965) can be recognised as New Zealand species by the localities given.

Only one Lepidoptera species in New Zealand has an aquatic larva, which has been described by Pendergrast & Cowley (1966).

Order EPHEMEROPTERA

Superfamily HEPTAGENIOIDEA

Family SIPHLONURIDAE

Subfamily SIPHLONURINAE Banks, 1900

Genus **Nesameletus** Tillyard, 1933

Nesameletus Tillyard, 1933, Proc. Linn. Soc. N.S.W. 58: 11.
Nesameletus ornatus (Eaton, 1883)
Chirotenetes ? ornatus Eaton, 1883, Trans. Linn. Soc. London (2) Zool. 3 (1): Pl. 19 (1883), (3): 208 (1885), (6): 321 (1888).
Nesameletus flavitinctus (Tillyard, 1923)
Ameletus flavitinctus Tillyard, 1923, Trans. Proc. N.Z. Inst. 54: 226.

Subfamily RALLIDENTINAE Penniket, 1966

Genus **Rallidens** Penniket, 1966

Rallidens Penniket, 1966, Rec. Canterbury Mus. 8 (2): 163.
Rallidens mcfarlanei Penniket, 1966
Rallidens mcfarlanei Penniket, 1966, Rec. Canterbury Mus. 8 (2): 164.

Subfamily AMELETOPSINAE Edmunds, 1957

Genus **Ameletopsis** Phillips, 1930

Ameletopsis Phillips, 1930, Trans. Proc. N.Z. Inst. 61: 324.
Ameletopsis perscitus (Eaton, 1899)
Ameletus perscitus Eaton, 1899, Trans. Ent. Soc. London, 1899: 291.

Subfamily COLOBURISCINAE Edmunds, 1963

Genus **Coloburiscus** Eaton, 1888

Coloburiscus Eaton, 1888, Trans. Linn. Soc. London (2) Zool. 3 (6): 346.
Coloburiscus humeralis (Walker, 1853)
Palingenia humeralis Walker, 1853, List neuropterous insects Br. Mus. Part 3: 552.
Coloburiscus tonnoiri Lestage, 1935
Coloburiscus tonnoiri Lestage, 1935, Bull. Annls. Soc. ent. Belg. 75: 353.

Subfamily ONISCIGASTRINAE Lameere, 1917

Genus **Oniscigaster** McLachlan, 1873

Oniscigaster McLachlan, 1873, Ent. Mon. Mag. 10: 109.
Oniscigaster wakefieldi McLachlan, 1873
Oniscigaster wakefieldi McLachlan, 1873, Ent. Mon. Mag. 10: 110.
Oniscigaster intermedius Eaton, 1899
Oniscigaster intermedius Eaton, 1899, Trans. Ent. Soc. London 1899: 292.
Oniscigaster distans Eaton, 1899
Oniscigaster distans Eaton, 1899, Trans. Ent. Soc. London 1899: 293.

Family SIPHLAENIGMATIDAE Penniket, 1962

Genus **Siphlaenigma** Penniket, 1962

Siphlaenigma Penniket, 1962, Rec. Canterbury Mus. 7 (5): 389.
Siphlaenigma janae Penniket, 1962
Siphlaenigma janae Penniket, 1962, Rec. Canterbury Mus. 7 (5): 390.

Family LEPTOPHLEBIIDAE

Genus **Zephlebia** Penniket, 1961

Zephlebia Penniket, 1961, N.Z. Ent. 2 (6): 8.

Subgenus **Zephlebia** Penniket, 1961

Zephlebia (Zephlebia) Penniket, 1961, N.Z. Ent. 2 (6): 8.
Zephlebia (Zephlebia) versicolor (Eaton, 1899)
Atalophlebia versicolor Eaton, 1899, Trans. Ent. Soc. London 1899: 286.
Zephlebia (Zephlebia) dentata (Eaton, 1871)
Leptophlebia dentata Eaton, 1871, Trans. Ent. Soc. London 1871: 80.
Zephlebia (Zephlebia) cruentata (Hudson, 1904)
Atalophlebia cruentata Hudson, 1904, N.Z. Neuroptera: 33.
Zephlebia (Zephlebia) borealis (Phiilips, 1923)
Atalophlebia borealis Phillips, 1923, Trans. Proc. N.Z. Inst. 61: 356.

Subgenus **Neozephlebia** Penniket, 1961

Zephlebia (Neozephlebia) Penniket, 1961, N.Z. Ent. 2 (6): 9.
Zephlebia (Neozephlebia) scita (Walker, 1853)
Baetis scita Walker, 1853, List neuropterous insects Br. Mus. Part 3: 570.
Zephlebia (Neozephlebia) nodularis (Eaton, 1871)
Leptophlebia nodularis Eaton, 1871, Trans. Ent. Soc. London 1871: 81.

Genus **Deleatidium** Eaton, 1899

Deleatidium Eaton, 1899, Trans. Ent. Soc. London 1899: 288.
Deleatidium vernale Phillips, 1930
Deleatidium vernale Phillips, 1930, Trans. Proc. N.Z. Inst. 61: 360.
Deleatidium lillii Eaton, 1899
Deleatidium lillii Eaton, 1899, Trans. Ent. Soc. London 1899: 289.
Deleatidium autumnale Phillips, 1930
Deleatidium autumnale Phillips, 1930, Trans. Proc. N.Z. Inst. 61: 371.
Deleatidium fumosum Phillips, 1930
Deleatidium fumosum Phillips, 1930, Trans. Proc. N.Z. Inst. 61: 372.
Deleatidium myzobranchia Phillips, 1930
Deleatidium myzobranchia Phillips, 1930, Trans. Proc. N.Z. Inst. 61: 373.
Deleatidium cerinum Phillips, 1930
Deleatidium cerinum Phillips, 1930, Trans. Proc. N.Z. Inst. 61: 382.

Genus **Atalophlebioides** Phillips, 1930

Deleatidium (Atalophlebioides) Phillips, 1930, Trans. Proc. N.Z. Inst. 61: 336.
Atalophlebioides sepia (Phillips, 1930)
Deleatidium (Atalophlebioides) sepia Phillips, 1930, Trans. Proc. N.Z. Inst. 61: 383.
Atalophlebioides cromwelli (Phillips, 1930)
Deleatidium (Atalophlebioides) cromwelli Phillips, 1930, Trans. Proc. N.Z. Inst. 61: 385.
Atalophlebioides aucklandensis Peters, 1971 Auckland Is
Atalophlebioides aucklandensis Peters, 1971, Pacific Insects Monogr. 27: 47.

Superfamily EPHEMEROIDEA

Family EPHEMERIDAE

Genus **Ichthybotus** Eaton, 1899

Ichthybotus Eaton, 1899, Trans. Ent. Soc. London 1899: 285.
Ichthybotus hudsoni (McLachlan, 1894)
Ephemera hudsoni McLachlan, 1894, Ent. Mon. Mag. (2) 5: 270.
Ichthybotus bicolor Tillyard, 1923
Ichthybotus bicolor Tillyard, 1923, Trans. Proc. N.Z. Inst. 54: 228.

Order ODONATA

Suborder ZYGOPTERA

Superfamily COENAGRIONOIDEA

Family COENAGRIONIDAE

Subfamily ISCHNURINAE

Genus **Ischnura** Charpentier, 1840

Ischnura Charpentier, 1840, Libell. Europ., 20.
Ischnura aurora aurora (Brauer, 1865) NZ, Kermadec Is
Agrion (Ischnura) aurora Brauer, 1865, Verh. zool.-bot. Ges. Wien 15: 510.

Subfamily PSEUDAGRIONINAE

Genus **Xanthocnemis** Tillyard, 1913

Xanthocnemis Tillyard, 1913, Proc. Linn. Soc. N.S.W. 37 (3): 465.
Xanthocnemis zealandica (McLachlan, 1873) NZ, Chatham Is
Telebasis zealandica McLachlan, 1873, Ann. Mag. Nat. Hist. (4) 12: 35.

Superfamily LESTINOIDEA

Subfamily LESTIDAE

Subfamily SYMPECMATINAE

Genus **Austrolestes** Tillyard, 1913

Austrolestes Tillyard, 1913, Proc. Linn. Soc. N.S.W. 37 (3): 421.
Austrolestes colensonis (White, 1846) NZ, Chatham Is
Agrion colensonis White, 1846, Zool. Voy. Erebus & Terror 2 Insects: Pl. 6, fig. 3.

Suborder ANISOPTERA

Family PETALURIDAE

Subfamily PETALURINAE

Genus **Uropetala** Selys, 1857

Uropetala Selys, 1857, Monogr. Gomphines, 368.
Uropetala carovei carovei (White, 1843)
Petalura carovei White, 1843, *In* Dieffenbach, Travels in N.Z. 2: 281.
Uropetala carovei chiltoni Tillyard, 1921
Uropetala chiltoni Tillyard, 1921, Trans. Proc. N.Z. Inst. 53: 342.

Family AESHNIDAE

Subfamily AESHNINAE

Genus **Aeshna** Fabricius, 1775

Aeshna Fabricius, 1775, Syst. Ent., 424.
Aeshna brevistyla Rambur, 1842 NZ, Kermadec Is
Aeshna brevistyla Rambur, 1842, Hist. Nat. Ins. Névropt., 205.

Subfamily ANACTINAE

Genus **Hemianax** Selys, 1883

Hemianax Selys, 1883, Bull. Acad. Sci. Belg. (3) 5: 723.
Hemianax papuensis (Burmeister, 1839) NZ, Kermadec Is
Aeschna papuensis Burmeister, 1839, Handb. d. Ent. 2: 841.

Family CORDULIIDAE

Subfamily CORDULIINAE

Genus **Antipodochlora** Fraser, 1939

Antipodochlora Fraser, 1939, Proc. R. Ent. Soc. London (B) 8: 94.
Antipodochlora braueri (Selys, 1871)
Epitheca braueri Selys, 1871, Syn. Cordulines, 50.

Genus **Hemicordulia** Selys, 1870

Hemicordulia Selys, 1870, Annls. Soc. ent. Belg. 14, C.R., v.
Hemicordulia australiae (Rambur, 1842) NZ, Kermadec Is
Cordulia australiae Rambur, 1842, Hist. Nat. Ins. Névropt., 146.

Genus **Procordulia** Martin, 1906

Procordulia Martin, 1906, Collect. Selys Cat. 17: 11, 16.
Procordulia smithii (White, 1846)
Cordulia smithii White, 1846, Zool. Voy. Erebus & Terror 2 Insects: Pl. 6, fig. 2.
Procordulia grayi (Selys, 1871)
Epitheca grayi Selys, 1871, Syn. Cordulines, 50.

Family LIBELLULIDAE

Subfamily SYMPETRINAE

Genus **Diplacodes** Kirby, 1889

Diplacodes Kirby, 1889, Trans. Zool. Soc. London 12: 263, 307.
Diplacodes bipunctata (Brauer, 1865)
Libellula (Diplax) bipunctata Brauer, 1865, Verh. zool.-bot. Ges. Wien 15: 503.

Order PLECOPTERA

Suborder ARCHIPERLARIA Illies, 1960

Superfamily EUSTHENIOIDEA Tillyard, 1926

Family EUSTHENIIDAE Tillyard, 1921

Subfamily STENOPERLINAE Tillyard, 1921

Genus **Stenoperla** McLachlan, 1866

Stenoperla McLachlan, 1866, Trans. Ent. Soc. London (3) 5: 354.
Stenoperla prasina (Newman, 1845)
Chloroperla prasina Newman, 1845, Zoologist 3: 852.

Suborder FILIPALPIA

Family AUSTROPERLIDAE Tillyard, 1921

Genus **Austroperla** Needham, 1905

Austroperla Needham, 1905, Proc. Biol. Soc. Washington 18: 109.
Austroperla cyrene (Newman, 1845)
Chloroperla cyrene Newman, 1845, Zoologist 3: 853.

Family GRIPOPTERYGIDAE Enderlein, 1909

Subfamily GRIPOPTERYGINAE Enderlein, 1909

Genus **Megaleptoperla** Tillyard, 1923

Megaleptoperla Tillyard, 1923, Trans. Proc. N.Z. Inst. 54: 204.
Megaleptoperla grandis (Hudson, 1913)
Leptoperla grandis Hudson, 1913, Trans. Proc. N.Z. Inst. 45: 51.

Megaleptoperla diminuta Kimmins, 1938
Megaleptoperla diminuta Kimmins, 1938, Ann. Mag. Nat. Hist. (11) 2: 568.

Subfamily LEPTOPERLINAE Banks, 1913

Genus **Aucklandobius** Enderlein, 1909

Aucklandobius Enderlein, 1909, Dt. ent. Z. 1909: 680.
Aucklandobius complementarius Enderlein, 1909 Auckland Is, Campbell I
Aucklandobius complementarius Enderlein, 1909, Dt. ent. Z. 1909: 679.
Aucklandobius fulvescens (Hare, 1910)
Leptoperla fulvescens Hare, 1910, Trans. N.Z. Inst. 42: 29.
Aucklandobius howesi (Tillyard, 1923)
Nesoperla howesi Tillyard, 1923, Trans. Proc. N.Z. Inst. 54: 209.
Aucklandobius spiniger (Tillyard, 1923)
Nesoperla spiniger Tillyard, 1923, Trans. Proc. N.Z. Inst. 54: 210.
Aucklandobius trivacuatus (Tillyard, 1923)
Nesoperla trivacuata Tillyard, 1923, Trans. Proc. N.Z. Inst. 54: 211.
Aucklandobius flavescens (Kimmins, 1938)
Nesoperla flavescens Kimmins, 1938, Ann. Mag. Nat. Hist. (11) 2: 570.

Genus **Zelandoperla** Tillyard, 1923

Zelandoperla Tillyard, 1923, Trans. Proc. N.Z. Inst. 54: 212.
Zelandoperla decorata Tillyard, 1923
Zelandoperla decorata Tillyard, 1923, Trans. Proc. N.Z. Inst. 54: 212.
Zelandoperla maculata (Hare, 1910)
Leptoperla maculata Hare, 1910, Trans. N.Z. Inst. 42: 29.
Zelandoperla fenestrata fenestrata Tillyard, 1923
Zelandoperla fenestrata Tillyard, 1923, Trans. Proc. N.Z. Inst. 54: 214.
Zelandoperla fenestrata pennulata McLellan, 1967
Zelandoperla fenestrata pennulata McLellan, 1967, Trans. R. Soc. N.Z. Zool. 9 (1): 9.
Zelandoperla agnetis McLellan, 1967
Zelandoperla agnetis McLellan, 1967, Trans. R. Soc. N.Z. Zool. 9 (1): 1.
Zelandoperla denticulata McLellan, 1967
Zelandoperla denticulata McLellan, 1967, Trans. R. Soc. N.Z. Zool. 9 (1): 5.

Genus **Vesicaperla** McLellan, 1967

Vesicaperla McLellan, 1967, Trans. R. Soc. N.Z. Zool. 9 (1): 11.
Vesicaperla substirpes McLellan, 1967
Vesicaperla substirpes McLellan, 1967, Trans. R. Soc. N.Z. Zool. 9 (1): 11.

Genus **Apteryoperla** Wisely, 1953

Apteryoperla Wisely, 1953, Rec. Canterbury Mus. 6 (3): 220.
Apteryoperla monticola Wisely, 1953
Apteryoperla monticola Wisely, 1953, Rec. Canterbury Mus. 6 (3): 220.
Apteryoperla angularis Wiseley, 1953
Apteryoperla angularis Wisely, 1953, Rec. Canterbury Mus. 6 (3): 227.
Apteryoperla turbotti Illies, 1963 Auckland Is
Apteryoperla turbotti Illies, 1963, Rec. Dominion Mus. 4 (19): 261.
Apteryoperla campbelli Illies, 1963 Campbell I
Apteryoperla campbelli Illies, 1963, Rec. Dominion Mus. 4 (19): 264.
Apteryoperla longicauda Illies, 1963 Campbell I
Apteryoperla longicauda Illies, 1963, Rec. Dominion Mus. 4 (19): 265.

Subfamily ANTARCTOPERLINAE Enderlein, 1909

Genus **Zelandobius** Tillyard, 1921

Zelandobius Tillyard, 1921, Can. Ent. 53: 43.
Zelandobius confusus (Hare, 1910)
Leptoperla confusa Hare, 1910, Trans. N.Z. Inst. 42: 29.
Zelandobius hudsoni (Hare, 1910)
Leptoperla hudsoni Hare, 1910, Trans. N.Z. Inst. 42: 30.
Zelandobius furcillatus Tillyard, 1923
Zelandobius furcillatus Tillyard, 1923, Trans. Proc. N.Z. Inst. 54: 207.
Zelandobius unicolor Tillyard, 1923
Zelandobius unicolor Tillyard, 1923, Trans. Proc. N.Z. Inst. 54: 208.
Zelandobius illiesi McLellan, 1969
Zelandobius illiesi McLellan, 1969, Trans. R. Soc. N.Z. Biol. Sci. 11 (3): 36.

Family NOTONEMOURIDAE Ricker, 1950

Genus **Notonemoura** Tillyard, 1923

Notonemoura Tillyard, 1923, Trans. Proc. N.Z. Inst. 54: 215.
Notonemoura latipennis latipennis Tillyard, 1923
Notonemoura latipennis Tillyard, 1923, Trans. Proc. N.Z. Inst. 54: 215.
Notonemoura latipennis paludis McLellan, 1968
Notonemoura latipennis paludis McLellan, 1968, Trans. R. Soc. N.Z. Zool., 10 (14): 137.
Notonemoura alisteri McLellan, 1968
Notonemoura alisteri McLellan, 1968, Trans. R. Soc. N.Z. Zool. 10 (14): 137.

Genus **Halticoperla** McLellan & Winterbourn, 1968

Halticoperla McLellan & Winterbourn, 1968, Trans. R. Soc. N.Z. Zool. 10 (13): 127.
Halticoperla viridans McLellan & Winterbourn, 1968
Halticoperla viridans McLellan & Winterbourn, 1968, Trans. R. Soc. N.Z. Zool. 10 (13): 127.

Genus **Spaniocerca** Tillyard, 1923

Spaniocerca Tillyard, 1923, Trans. Proc. N.Z. Inst. 54: 217.
Spaniocerca zelandica Tillyard, 1923
Spaniocerca zelandica Tillyard, 1923, Trans. Proc. N.Z. Inst. 54: 216.

Genus **Spaniocercoides** Kimmins, 1938

Spaniocercoides Kimmins, 1938, Ann. Mag. Nat. Hist. (11) 2: 576.
Spaniocercoides hudsoni Kimmins, 1938
Spaniocercoides hudsoni Kimmins, 1938, Ann. Mag. Nat. Hist. (11) 2: 577.
Spaniocercoides cowleyi (Winterbourn, 1965)
Notonemoura cowleyi Winterbourn, 1965, N.Z. J. Sci. 8 (3): 278.

Genus **Cristaperla** McLellan, 1973

Cristaperla McLellan, 1973, N.Z. J. Mar. Freshwat. Res. 6 (4): 475.
Cristaperla fimbria (Winterbourn, 1965)
Spaniocercoides fimbria Winterbourn, 1965, N.Z. J. Sci. 8 (3): 280.

Genus **Omanuperla** McLellan, 1973

Omanuperla McLellan, 1973, N.Z. J. Mar. Freshwat. Res. 6 (4): 478.
Omanuperla bruningi McLellan, 1973
Omanuperla bruningi McLellan, 1973, N.Z. J. Mar. Freshwat. Res. 6 (4): 478.

Species dubiae

Gripopteryx zeelandica Sámal, 1921
Gripopteryx zeelandica Sámal, 1921, Cas. csl. Spol. ent. 18 (1, 2): 20. 18 (3, 4): 68.

Order HEMIPTERA

Suborder HETEROPTERA

Superfamily SALDOIDEA

Family SALDIDAE

Genus **Saldula** Van Duzee, 1914

Saldula Van Duzee, 1914, Can. Ent. 46: 387.
Saldula australis (White, 1876)
Salda australis White, 1876, Ent. Mon. Mag. 13: 106.
Saldula butleri (White, 1878)
Salda butleri White, 1878, Ent. Mon. Mag. 15: 160.
Saldula laelaps (White, 1878)
Salda laelaps White, 1878, Ent. Mon. Mag. 15: 160.
Saldula stoneri Drake & Hoberlandt, 1950
Saldula stoneri Drake & Hoberlandt, 1950, Acta. Ent. Mus. Nat. Pragae 26 (374): 1.
Saldula parvula Cobben, 1961
Saldula parvula Cobben, 1961, Ent. Ber., Amsterdam, 21: 101.
Saldula trivialis Cobben, 1961
Saldula trivialis Cobben, 1961, Ent. Ber., Amsterdam, 21: 102.
Saldula maculipennis Cobben, 1961
Saldula maculipennis Cobben, 1961, Ent. Ber., Amsterdam, 21: 104.

Superfamily GERROIDEA

Family GERRIDAE

Genus **Halobates** Eschscholtz, 1822

Halobates Eschscholtz, 1822, Entomographien 1 (1): 106.
Halobates sericeus Eschscholtz, 1822 — Kermadec Is
Halobates sericeus Eschscholtz, 1822, Entomographien 1 (1): 108.

Family VELIIDAE

Genus **Microvelia** Westwood, 1834

Microvelia Westwood, 1834, Annls. Soc. ent. Fr. 3: 647.
Microvelia macgregori (Kirkaldy, 1899)
Hydroessa macgregori Kirkaldy, 1899, Revue ent., Caen 18: 91.
Microvelia halei Esaki, 1928
Microvelia halei Esaki, 1928, Insects Samoa 2 (2): 69.

Family HYDROMETRIDAE

Genus **Hydrometra** Latreille, 1796

Hydrometra Latreille, 1796, Préc. Car. Ins., 86.
Hydrometra ribesci Hungerford, 1938
Hydrometa ribesci Hungerford, 1938, Pan-Pacific Ent. 14: 76.

Superfamily NOTONECTOIDEA

Family NOTONECTIDAE

Genus **Anisops** Spinola, 1837

Anisops Spinola, 1837, Ess. Ins. Hémipt., 58.
Anisops wakefieldi White, 1878 — NZ, Chatham Is

Anisops wakefieldi White, 1878, Ent. Mon. Mag. 15: 161.
Anisops assimilis White, 1878
Anisops assimilis White, 1878, Ent. Mon. Mag. 15: 161.

Superfamily CORIXOIDEA
Family CORIXIDAE
Subfamily CORIXINAE
Genus **Sigara** Fabricius, 1775

Sigara Fabricius, 1775, Syst. Ent., 691.

Subgenus **Tropocorixa** Hutchinson, 1940

Tropocorixa Hutchinson, 1940, Trans. Connecticut Acad. Arts Sci. 33: 413.
Sigara (Tropocorixa) arguta (White, 1878)
Corixa arguta White, 1878, Ent. Mon. Mag. 15: 161.
Sigara (Tropocorixa) potamius Young, 1962
Sigara (Tropocorixa) potamius Young, 1962, Rec. Canterbury Mus. 7 (5): 337.
Sigara (Tropocorixa) limnochares Young, 1962
Sigara (Tropocorixa) limnochares Young, 1962, Rec. Canterbury Mus. 7 (5): 342.
Sigara (Tropocorixa) infrequens Young, 1962
Sigara (Tropocorixa) infrequens Young, 1962, Rec. Canterbury Mus. 7 (5): 346.
Sigara (Tropocorixa) uruana Young, 1962
Sigara (Tropocorixa) uruana Young, 1962, Rec. Canterbury Mus. 7 (5): 350.

Subfamily DIAPREPOCORINAE Lundblad
Genus **Diaprepocoris** Kirkaldy, 1897

Diaprepocoris Kirkaldy, 1897, Ann. Mag. Nat. Hist. (6) 20: 52.
Diaprepocoris zealandiae Hale, 1924
Diaprepocoris zealandiae Hale, 1924, Trans. R. Soc. S. Aust. 48: 9.

Order MEGALOPTERA
Family CORYDALIDAE
Subfamily CHAULIODINAE
Tribe CHAULIODINI van der Weele, 1909
Genus **Archichauliodes** van der Weele, 1909

Archichauliodes van der Weele, 1909, Notes Leyden Mus. 30 (4): 258.
Archichauliodes diversus (Walker, 1853)
Hermes diversus Walker, 1853, List neuropterous insects Br. Mus. Part 2: 205.

Order COLEOPTERA
Suborder ADEPHAGA
Superfamily CARABOIDEA
Family DYTISCIDAE Leach, 1815
Subfamily HYDROPORINAE Régimbart, 1879
Tribe BIDESSINI Sharp 1882
Genus **Liodessus** Guignot, 1939

Liodessus Guignot, 1939, Bull. Soc. Nat. Vaucluse: 53.
Liodessus plicatus (Sharp, 1882)
Bidessus plicatus Sharp, 1882, Sci. Trans. R. Dublin Soc. (2) 2: 360.

Liodessus deflectus Ordish, 1966
Liodessus deflectus Ordish, 1966, Rec. Dominion Mus. 5 (22): 229.
Liodessus oliveri Ordish, 1966 Kermadec Is
Liodessus oliveri Ordish, 1966, Rec. Dominion Mus. 5 (22): 230.

Genus **Huxelhydrus** Sharp, 1882
Huxelhydrus Sharp, 1882, Sci. Trans. R. Dublin Soc. (2) 2: 369.
Huxelhydrus syntheticus Sharp, 1882
Huxelhydrus syntheticus Sharp, 1882, Sci. Trans. R. Dublin Soc. (2) 2: 369.

Tribe HYPHYDRINI Sharp, 1882
Genus **Hyphydrus** Illiger, 1802
Hyphydrus Illiger, 1802, Mag. Insektenk. 1: 299.

Subgenus **Apriophorus** Guignot, 1959
Hyphydrus (Apriophorus) Guignot, 1959, Annls. Mus. r. Congo belge: 70.
Hyphydrus (Apriophorus) elegans (Montrouzier, 1860)
Pachetes elegans Montrouzier, 1860, Annls. Soc. ent. Fr.: 245.

Tribe HYDROPORINI Sharp, 1882
Genus **Antiporus** Sharp, 1882
Antiporus Sharp, 1882, Sci. Trans. R. Dublin Soc. (2) 2: 410.
Antiporus strigosulus (Broun, 1880)
Hydroporus strigosulus Broun, 1880, Manual N.Z. Coleoptera 1: 72.
Antiporus wakefieldi (Sharp, 1876)
Hydroporus wakefieldi Sharp, 1876, Ent. Mon. Mag. 13: 20.

Subfamily COLYMBETINAE
Tribe COPELATINI Régimbart, 1895
Genus **Copelatus** Erichson, 1832
Copelatus Erichson, 1832, Gen. Dytic., 38.
Copelatus australis (Clark, 1863)
Celina australis Clark, 1863, J. Ent. 2: 14.

Tribe COLYMBETINI Régimbart, 1895
Genus **Lancetes** Sharp, 1882
Lancetes Sharp, 1882, Sci. Trans. R. Dublin Soc. (2) 2: 897.
Lancetes lanceolatus (Clark, 1863)
Colymbetes lanceolatus Clark, 1863, J. Ent. 2: 16.

Genus **Rhantus** Lacordaire, 1835
Rhantus Lacordaire, 1835, *In* Boisduval & Lacordaire, Faune ent. Paris 1: 309.
Rhantus pulverosus (Stephens, 1828) NZ, Kermadec Is, Chatham Is
Colymbetes pulverosus Stephens, 1828. Illustrations British Ent. Mandibulata 2: 69.
Rhantus plantaris Sharp, 1882
Rhantus plantaris Sharp, 1882, Sci. Trans. R. Dublin Soc. (2) 2: 608.

Subfamily DYTISCINAE Bedel, 1881
Tribe DYTISCINI Sharp
Genus **Dytiscus** Linnaeus, 1758
Dytiscus Linnaeus, 1758, Syst. Nat. Ed. 10: 411.
Dytiscus semisulcatus Muller, 1776
Dytiscus semisulcatus Muller, 1776, Zool. Dan. Prodr., 70.

Tribe CYBISTERINI Sharp, 1882

Genus **Homoeodytes** Régimbart, 1879

Homoeodytes Régimbart, 1879, Annls. Soc. ent. Fr. (5) 8: 458.
Homoeodytes hookeri (White, 1846)
Cybister hookeri White, 1846, Zool. Voy. Erebus & Terror 2 Insects: 6.
Homoeodytes scutellaris (Germar, 1824)
Cybister scutellaris Germar, 1824, Linn. Ent. 3: 171.

Family GYRINIDAE Leach, 1815

Genus **Gyrinus** Linnaeus, 1767

Gyrinus Linnaeus, 1767, Syst. Nat. Ed. 12: 567.
Gyrinus convexiusculus Macleay, 1871
Gyrinus convexiusculus Macleay, 1871, Trans. Ent. Soc. N.S.W. 2 (2, 3): 128.

Suborder POLYPHAGA

Superfamily HYDROPHILOIDEA

Family HYDRAENIDAE

Genus **Orchymontia** Broun, 1919

Orchymontia Broun, 1919, Annls. Soc. ent. Belg. 59: 108.
Orchymontia spinipennis Broun, 1919
Orchymontia spinipennis Broun, 1919, Annls. Soc. ent. Belg. 59: 108.

Family HYDROPHILIDAE Latreille [1802]

Subfamily SPHAERIDIINAE Latreille [1802]

Genus **Stygnohydrus** Broun, 1893

Stygnohydrus Broun, 1893, Manual N.Z. Coleoptera 6: 1336.
Stygnohydrus femoralis Broun, 1910
Stygnohydrus femoralis Broun, 1910, Bull. N.Z. Inst. 1: 12.

Subfamily HYDROPHILINAE

Genus **Limnoxenus** Motschoulsky, 1853

Limnoxenus Motschoulsky, 1853, Hydrocanthares de la Russie, 10.
Limnoxenus zealandicus (Broun, 1880)
Hydrobius zealandicus Broun, 1880, Manual N.Z. Coleoptera: 77.

Genus **Laccobius** Erichson, 1837

Laccobius Erichson, 1837, Käfer Mark Brand. 1 (1): 202.
Laccobius arrowi d'Orchymont, 1925
Laccobius arrowi d'Orchymont, 1925, Bull. Annls. Soc. ent. Belg. 65: 68.
Laccobius mineralis Winterbourn, 1970
Laccobius mineralis Winterbourn, 1970, Trans. R. Soc. N.Z. Biol. Sci. 12 (4): 25.

Genus **Enochrus** Thomson, 1859

Enochrus Thomson, 1859, Skand. Coleopt. 1: 18.
Enochrus tritus (Broun, 1880) NZ, Kermadec Is
Philhydrus tritus Broun, 1880, Manual N.Z. Coleoptera 1: 78.

Genus **Berosus** Leach, 1817

Berosus Leach, 1817, Zool. Miscell. 3: 92.

Subgenus **Phelerosus** Sharp, 1884

Phelerosus Sharp, 1884, Trans. Ent. Soc. London 1884: 480.
Berosus (Phelerosus) pallidipennis (Sharp, 1884)
Phelerosus pallidipennis Sharp, 1884, Trans. Ent. Soc. London 1884: 480.

Genus **Paracymus** Thomson, 1867

Paracymus Thomson, 1867, Skand. Coleopt. 9: 120.
Paracymus pygmaeus (Macleay, 1871)
Cyclonotum pygmaeum Macleay, 1871, Trans. Ent. Soc. N.S.W. 2 (2, 3): 133.

Genus **Anacaena** Thomson, 1859

Anacaena Thomson, 1859, Skand. Coleopt. 1: 18.
Anacaena tepida Winterbourn, 1970
Anacaena tepida Winterbourn, 1970, Trans. R. Soc. N.Z. Biol. Sci. 12 (4): 27.

Superfamily EUCINETOIDEA

Family HELODIDAE

Superfamily DRYOPOIDEA

Family ELMIDAE Shuckard, 1839

Genus **Hydora** Broun, 1882

Hydora Broun, 1882, Ann. Mag. Nat. Hist. (5) 9: 409.
Hydora lanigera Broun, 1914
Hydora lanigera Broun, 1914, Bull. N.Z. Inst. 1 (3): 154.
Hydora nitida Broun, 1885
Hydora nitida Broun, 1885, N.Z. J. Sci. 2 (8): 385.
Hydora obsoleta Broun, 1885
Hydora obsoleta Broun, 1885, N.Z. J. Sci. 2 (8): 385.
Hydora picea (Broun, 1881)
Pachycephala piceum Broun, 1881, Manual N.Z. Coleoptera 2: 672.
Hydora subaenea Broun, 1914
Hydora subaenea Broun, 1914, Bull. N.Z. Inst. 1 (3): 154.
Hydora vestita Broun, 1914
Hydora vestita Broun, 1914, Bull. N.Z. Inst. 1 (3): 153.

Superfamily CURCULIONOIDEA

Family CURCULIONIDAE

Subfamily RHYPAROSOMINAE

Genus **Desiantha** Pascoe, 1870

Desiantha Pascoe, 1870, Trans. Ent. Soc. London 1870: 193.
Desiantha ascita (Pascoe, 1876)
Brexius ascitus Pascoe, 1876, Ann. Mag. Nat. Hist. (4) 18: 59.

Order MECOPTERA

Suborder EUMECOPTERA

Family NANNOCHORISTIDAE Tillyard, 1917

Genus **Choristella** Tillyard, 1917

Choristella Tillyard, 1917, Proc. Linn. Soc. N.S.W. 42: 298.
Choristella philpotti Tillyard, 1917
Choristella philpotti Tillyard, 1917, Proc. Linn. Soc. N.S.W. 42: 299.

Order DIPTERA

Suborder NEMATOCERA

Division TIPULOMORPHA

Family TIPULIDAE

Genus **Limonia** Meigen, 1803

Limonia Meigen, 1803, *In* Illiger, Mag. Insektenk. 2: 262.

Subgenus **Idioglochina** Alexander, 1921

Idioglochina Alexander, 1921, Can. Ent. 53: 207.
Limonia (Idioglochina) fumipennis (Butler, 1875)
Limnobia fumipennis Butler, 1875, Cist. Ent. 1: 355.
Limonia (Idioglochina) allani Alexander, 1959
Limonia (Idioglochina) allani Alexander, 1959, Ann. Mag. Nat. Hist. (13) 1 (10): 674.
Limonia (Idioglochina) kronei (Mik, 1881) Auckland Is, Campbell I
Dicranomyia kronei Mik 1881, Verh. zool.-bot. Ges. Wien 31: 199.

Subgenus **Dicranomyia** Stephens, 1829

Dicranomyia Stephens, 1829, Syst. Cat. Brit. Ins. 2: 243.
Limonia (Dicranomyia) gracilis (Edwards, 1923) NZ, Chatham Is
Dicranomyia gracilis Edwards, 1923, Trans. Proc. N.Z. Inst. 54: 283.
Limonia (Dicranomyia) subviridis (Alexander, 1922)
Dicranomyia subviridus Alexander, 1922, Ann. Ent. Soc. Am. 15: 223.
Limonia (Dicranomyia) wiseana Alexander, 1955
Limonia (Dicranomyia) wiseana Alexander, 1955, Ann. Mag. Nat. Hist. (12) 8: 669.

Division PSYCHODOMORPHA

Family PSYCHODIDAE

Genus **Psychoda** Latreille, 1796

Pyschoda Latreille, 1796, Préc. Car. Ins., 152.
Psychoda alternata Say, 1824
Psychoda alternata Say, 1824, Narrative exped. source St. Peter's River 2: 358.

Division CULICOMORPHA

Family CULICIDAE

Subfamily DIXINAE

Tribe DIXINI

Genus **Neodixa** Tonnoir, 1925

Neodixa Tonnoir, 1925, Rec. Canterbury Mus. 2 (5): 311.
Neodixa minuta (Tonnoir, 1924)
Dixella minuta Tonnoir, 1924, Rec. Canterbury Mus. 2 (4): 230.

Genus **Nothodixa** Edwards, 1930

Dixa (Nothodixa) Edwards, 1930, Diptera Patagonia & S. Chile 2 (3): 101.
Nothodixa campbelli (Alexander, 1922)
Dixa campbelli Alexander, 1922, Insecutor Inscit. menstr. 10: 20.
Nothodixa philpotti (Tonnoir, 1924)
Dixa philpotti Tonnoir, 1924, Rec. Canterbury Mus. 2 (4): 227.
Nothodixa otagensis (Alexander, 1922)
Dixa otagensis Alexander, 1922, Insecutor Inscit. menstr. 10: 147.
Nothodixa septentrionalis (Tonnoir, 1924)
Dixa septentrionalis Tonnoir, 1924, Rec. Canterbury Mus. 2 (4): 226.

Tribe PARADIXINI

Genus **Paradixa** Tonnoir, 1924

Dixa (Paradixa) Tonnoir, 1924, Rec. Canterbury Mus. 2 (4): 222.
Paradixa neozelandica (Tonnoir, 1924)
Dixa neozelandica Tonnoir, 1924, Rec. Canterbury Mus. 2 (4): 228.
Paradixa fuscinervis (Tonnoir, 1924)
Dixa fuscinervis Tonnoir, 1924, Rec. Canterbury Mus. 2 (4): 229.
Paradixa tonnoiri Belkin, 1968
Paradixa tonnoiri Belkin, 1968, Contr. Am. Ent. Inst. 3 (1): 44.
Paradixa harrisi (Tonnoir, 1925)
Dixa harrisi Tonnoir, 1925, Rec. Canterbury Mus. 2 (5): 311.

Subfamily CULICINAE

Tribe CULICINI

Genus **Culex** Linnaeus, 1758

Culex Linnaeus, 1758, Syst. Nat. Ed. 10: 602.

Subgenus **Culex**

Culex (Culex) pervigilans Bergroth, 1889
Culex pervigilans Bergroth, 1889, Wiener ent. Ztg. 8: 295.
Culex (Culex) rotoruae Belkin, 1968
Culex (Culex) rotoruae Belkin, 1968, Contr. Am. Ent. Inst. 3 (1): 64.
Culex (Culex) asteliae Belkin, 1968
Culex (Culex) asteliae Belkin, 1968, Contr. Am. Ent. Inst. 3 (1): 66.
Culex (Culex) quinquefasciatus Say, 1823
Culex 5-fasciatus Say, 1823, J. Acad. Nat. Sci. Philadelphia 3: 10.

Tribe CULISETINI

Genus **Culiseta** Felt, 1904

Culiseta Felt, 1904, Bull. New York St. Mus. 79: 391.

Sugenus **Climacura** Howard, Dyar & Knab, 1915

Climacura Howard, Dyar & Knabb, 1915, Publs. Carnegie Instn. 159 (3): 452.
Culiseta (Climacura) tonnoiri (Edwards, 1925)
Theobaldia tonnoiri Edwards, 1925, Bull. Ent. Res. 15 (3): 258.
Culiseta (Climacura) novaezealandiae Pillai, 1966
Culiseta (Climacura) novaezealandiae Pillai, 1966, Trans. R. Soc. N.Z. Zool. 8 (11): 125.

Tribe MANSONIINI

Genus **Coquillettidia** Dyar, 1905

Coquillettidia Dyar, 1905, Proc. Ent. Soc. Washington 7: 47.

Subgenus **Austromansonia** Belkin, 1968

Coquillettidia (Austromansonia) Belkin, 1968, Contr. Am. Ent. Inst. 3 (1): 76.
Coquillettidia (Austromansonia) tenuipalpis (Edwards, 1924)
Taeniorhynchus (Coquillettidia) tenuipalpis Edwards, 1924, Bull. Ent. Res. 14 (4): 366.

Subgenus **Coquillettidia**

Coquillettidia (Coquillettidia) iracunda (Walker, 1848)
Culex iracundus Walker, 1848, List dipterous insects Br. Mus. Part 1: 6.

Tribe AEDINI

Genus **Opifex** Hutton, 1902

Opifex Hutton, 1902, Trans. Proc. N.Z. Inst. 34: 188.
Opifex fuscus Hutton, 1902
Opifex fuscus Hutton, 1902, Trans. Proc. N.Z. Inst. 34: 188.

Genus **Aedes** Meigen, 1818

Aedes Meigen, 1818, Syst. Beschr. Zweifl. Insekt. 1: 13.

Subgenus **Nothoskusea** Dumbleton, 1962

Aedes (Nothoskusea) Dumbleton, 1962, N.Z.J. Sci. 5: 20.
Aedes (Nothoskusea) chathamicus Dumbleton, 1962 Chatham Is
Aedes (Nothoskusea) chathamicus Dumbleton, 1962, N.Z. J. Sci. 5: 20.

Subgenus **Halaedes** Belkin, 1962

Aedes (Halaedes) Belkin, 1962, Mosquitoes S. Pacific 1: 328.
Aedes (Halaedes) australis (Erichson, 1842)
Culex australis Erichson, 1842, Arch. Naturgesch. 8 (1): 270.

Subgenus **Ochlerotatus** Lynch Arribálzaga, 1891

Ochlerotatus Lynch Arribálzaga, 1891, Revta. Mus. La Plata 1: 374.
Aedes (Ochlerotatus) antipodeus (Edwards, 1920)
Ochlerotatus antipodeus Edwards, 1920, Bull. Ent. Res. 10: 132.
Aedes (Ochlerotatus) subalbirostris Klein & Marks, 1960
Aedes (Ochlerotatus) subalbirostris Klein & Marks, 1960, Proc. Linn. Soc. N.S.W. 85: 115.

Subgenus **Finlaya** Theobald, 1903

Finlaya Theobald, 1903, Monograph Culicidae 3: 281.
Aedes (Finlaya) notoscriptus (Skuse, 1889)
Culex notoscriptus Skuse, 1889, Proc. Linn. Soc. N.S.W. 2 (3): 1738.

Tribe SABETHINI

Genus **Maorigoeldia** Edwards, 1930

Rachionotomyia (Maorigoeldia) Edwards, 1930, Bull. Ent. Res. 21: 302.
Maorigoeldia argyropus (Walker, 1848)
Culex argyropus Walker, 1848, List dipterous insects Br. Mus. Part 1: 2.

Subfamily CHAOBORINAE

Tribe CORETHRELLINI

Genus **Corethrella** Coquillett, 1902

Corethrella Coquillett, 1902, J. New York Ent. Soc. 10: 191.

Subgenus **Notocorethrell**a Belkin, 1968

Corethrella (Notocorethrella) Belkin, 1968, Contr. Am. Ent. Inst. 3 (1): 110.
Corethrella (Notocorethrella) novaezealandiae Tonnoir, 1927
Corethrella novae-zealandiae Tonnoir, 1927, Rec. Canterbury Mus. 3 (2): 107.

Family CHIRONOMIDAE

Subfamily TANYPODINAE

Genus **Pentaneura** Phillipi, 1865

Pentaneura Phillipi, 1865, Verh. zool.-bot. Ges. Wien 15: 629.
Pentaneura harrisi Freeman, 1959
Pentaneura (Pentaneura) harrisi Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 400.

Genus **Ablabesmyia** Johannsen, 1905

Ablabesmyia Johannsen, 1905, Bull. New York St. Mus. 86: 135.
Ablabesmyia malus (Hutton,1902)
Tanypus malus Hutton, 1902, Trans. Proc. N.Z. Inst. 34: 187.

Genus **Anatopynia** Johannsen, 1905

Anatopynia Johannsen, 1905, Bull. New York St. Mus. 86: 135.
Anatopynia antarctica (Hudson, 1892)
Corethra antarctica Hudson, 1892, Manual N.Z. Entomology, 43.
Anatopynia apicincta Freeman, 1959
Anatopynia apicincta Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 403.
Anatopynia languidus (Hutton, 1902)
Tanypus languidus Hutton, 1902, Trans. Proc. N.Z. Inst. 34: 186.
Anatopynia debilis (Hutton,1902)
Tanypus debilis Hutton, 1902, Trans. Proc. N.Z. Inst. 34: 186.
Anatopynia quinquepunctata Freeman, 1959
Anatopynia quinquepunctata Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 405.
Anatopynia flavipes Freeman, 1959
Anatopynia flavipes Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 405.
Anatopynia apicinella Freeman, 1959
Anatopynia apicinella Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 406.
Anatopynia umbrosa Freeman, 1959
Anatopynia umbrosa Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 406.
Anatopynia quadricincta Freeman, 1959
Anatopynia quadricincta Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 407.
Anatopynia cana Freeman, 1959
Anatopynia cana Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 408.

Subfamily PODONOMINAE

Tribe PODONOMINI

Genus **Zelandochlus** Brundin, 1966

Zelandochlus Brundin, 1966, Kungl. Sv. Vet. Akad. Handl. (4) 11 (1): 106.
Zelandochlus latipalpis Brundin, 1966
Zelandochlus latipalpis Brundin, 1966, Kungl. Sv. Vet. Akad. Handl. (4) 11 (1): 107.

Genus **Parochlus** Enderlein, 1912

Parochlus Enderlein, 1912, Kungl. Sv. Vet. Akad. Handl. 48 (3): 109.
Parochlus conjungens Brundin, 1966
Parochlus conjungens Brundin, 1966, Kungl. Sv. Vet. Akad. Handl. (4) 11 (1): 128.
Parochlus aotearoae Brundin, 1966
Parochlus aotearoae Brundin, 1966, Kungl. Sv. Vet. Akad. Handl. (4) 11 (1): 138.
Parochlus spinosus Brundin, 1966
Parochlus spinosus Brundin, 1966, Kungl. Sv. Vet. Akad. Handl. (4) 11 (1): 138.
Parochlus maorii Brundin, 1966
Parochlus maorii Brundin, 1966, Kungl. Sv. Vet. Akad. Handl. (4) 11 (1): 144.
Parochlus ohakunensis (Freeman, 1959)
Podonomus ohakunensis Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 409.
Parochlus carinatus Brundin, 1966
Parochlus carinatus Brundin, 1966, Kungl. Sv. Vet. Akad. Handl. (4) 11 (1): 151.
Parochlus pauperatus Brundin, 1966
Parochlus pauperatus Brundin, 1966, Kungl. Sv. Vet. Akad. Handl. (4) 11 (1): 153.

Parochlus novaezelandiae Brundin, 1966
Parochlus novaezelandiae Brundin, 1966, Kungl. Sv. Vet. Akad. Handl. (4) 11 (1): 154.
Parochlus longicornis Brundin, 1966
Parochlus longicornis Brundin, 1966, Kungl. Sv. Vet. Akad. Handl. (4) 11 (1): 155.
Parochlus glacialis Brundin, 1966
Parochlus glacialis Brundin, 1966, Kungl. Sv. Vet. Akad. Handl. (4) 11 (1): 155.

Genus **Podonomus** Phillipi, 1865

Podonomus Phillipi, 1865, Verh. zool.-bot. Ges. Wien 15: 601.
Podonomus parochloides Brundin, 1966
Podonomus parochloides Brundin, 1966, Kungl. Sv. Vet. Akad. Handl. (4) 11 (1): 199.
Podonomus waikukupae Brundin, 1966
Podonomus waikukupae Brundin, 1966, Kungl. Sv. Vet. Akad. Handl. (4) 11 (1): 200.
Podonomus pygmaeus Brundin, 1966
Podonomus pygmaeus Brundin, 1966, Kungl. Sv. Vet. Akad. Handl. (4) 11 (1): 200.

Genus **Podochlus** Brundin, 1966

Podochlus Brundin, 1966, Kungl. Sv. Vet. Akad. Handl. (4) 11 (1): 240.
Podochlus grandis Brundin, 1966
Podochlus grandis Brundin, 1966, Kungl. Sv. Vet. Akad. Handl. (4) 11 (1): 248.
Podochlus stouti Brundin, 1966
Podochlus stouti Brundin, 1966, Kungl. Sv. Vet. Akad. Handl. (4) 11 (1): 250.
Podochlus cockaynei Brundin, 1966
Podochlus cockaynei Brundin, 1966, Kungl. Sv. Vet. Akad. Handl. (4) 11 (1): 252.
Podochlus knoxi Brundin, 1966
Podochlus knoxi Brundin, 1966, Kungl. Sv. Vet. Akad. Handl. (4) 11 (1): 253.

Subfamily DIAMESINAE (sensu Brundin, 1966)

Tribe HEPTAGYINI (sensu Brundin, 1966)

Genus **Maoridiamesa** Pagast, 1947

Maoridiamesa Pagast, 1941, Arch. Hydrobiol. 41: 448.
Maoridiamesa harrisi Pagast, 1947
Maoridiamesa harrisi Pagast, 1947, Arch. Hydrobiol. 41: 448.
Maoridiamesa intermedia Brundin, 1966
Maoridiamesa intermedia Brundin, 1966, Kungl. Sv. Vet. Akad. Handl. (4) 11 (1): 411.
Maoridiamesa stouti Brundin, 1966
Maoridiamesa stouti Brundin, 1966, Kungl. Sv. Vet. Akad. Handl. (4) 11 (1): 412.
Maoridiamesa glacialis Brundin, 1966
Maoridiamesa glacialis Brundin, 1966, Kungl. Sv. Vet. Akad. Handl. (4) 11 (1): 414.
Maoridiamesa insularis Brundin, 1966 Campbell I
Maoridiamesa insularis Brundin, 1966, Kungl. Sv. Vet. Akad. Handl. (4) 11 (1): 414.

Tribe LOBODIAMESINI (sensu Brundin 1966)

Genus **Lobodiamesa** Pagast, 1947

Lobodiamesa Pagast, 1947, Arch. Hydrobiol. 41: 446.
Lobodiamesa campbelli Pagast, 1947
Lobodiamesa campbelli Pagast, 1947, Arch. Hydrobiol. 41: 446.

Subfamily TELMATOGETONINAE (sensu Brundin, 1966)

Genus **Halirytus** Eaton, 1875

Halirytus Eaton, 1875, Ent. Mon. Mag. 12: 60.
Halirytus macquariensis Brundin, 1962 Macquarie I
Halirytus macquariensis Brundin, 1962, Pacific Insects 4 (4): 945.

Subfamily ORTHOCLADIINAE

Genus **Diplocladius** Kieffer, 1908

Diplocladius Kieffer, 1908, Z. wiss. Insektenbiol. 4: 6.

Subgenus **Stictocladius** Edwards, 1931

Spaniotoma (Stictocladius) Edwards, 1931, Diptera Patagonia & S. Chile 2 (5): 279.
Diplocladius (Stictocladius) lacuniferus Freeman, 1959
Diplocladius lacuniferus Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 416.
Diplocladius (Stictocladius) pictus Freeman, 1959
Diplocladius pictus Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 416.

Genus **Syncricotopus** Brundin, 1956

Syncricotopus Brundin, 1956, Rep. Inst. Freshwat. Res. Drottningholm No. 37: 106.
Syncricotopus pluriserialis (Freeman, 1959)
Trichocladius pluriserialis Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 414.

Genus **Cricotopus** van der Wulp, 1874

Cricotopus van der Wulp, 1874, Tijdschr. Ent. 17: 132.
Cricotopus zealandicus Freeman, 1959
Cricotopus zealandicus Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 413.
Cricotopus cingulatus (Hutton, 1902)
Orthocladius cingulatus Hutton, 1902, Trans. Proc. N.Z. Inst. 34: 184.

Genus **Austrocladius** Freeman, 1961

Austrocladius Freeman, 1961, Aust. J. Zool. 9: 647.
Austrocladius harrisi (Freeman, 1959)
Chaetocladius harrisi Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 418.

Genus **Lymnophyes** Eaton, 1875

Lymnophyes Eaton, 1875, Ent. Mon. Mag. 12: 60.
Lymnophyes vestitus (Skuse, 1889)
Camptocladius vestitus Skuse, 1889, Proc. Linn. Soc. N.S.W. (2) 4: 263.

Genus **Metriocnemus** van der Wulp, 1874

Metriocnemus van der Wulp, 1874, Tijdschr. Ent. 17: 136.
Metriocnemus lobifer Freeman, 1959
Metriocnemus lobifer Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 412.

Genus **Orthocladius** van der Wulp, 1874

Orthocladius van der Wulp, 1874, Tijdschr. Ent. 17: 132.
Orthocladius pictipennis Freeman, 1959
Orthocladius pictipennis Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 419.

Genus **Smittia** Holmgren, 1869

Smittia Holmgren, 1869, Kungl. Sv. Vet. Akad. Handl. 8: 47.
Smittia verna (Hutton, 1902)
Camptocladius vernus Hutton, 1902, Trans. Proc. N.Z. Inst. 34: 185.

Genus **Camptocladius** van der Wulp, 1874

Camptocladius van der Wulp, 1874, Tijdschr. Ent. 17: 133.
Camptocladius stercorarius (De Geer, 1776)
Tipula stercoraria De Geer, 1776, Mémoires pour servir à l'histoire des insectes 6: 388.

Genus **Corynoneura** Winnertz, 1846

Corynoneura Winnertz, 1846, Stettin. ent. Ztg. 7: 12.
Corynoneura donovani Forsyth, 1971
Corynoneura donovani Forsyth, 1971, J. R. Soc. N.Z. 1 (2): 121.

Subfamily CHIRONOMINAE

Tribe CHIRONOMINI

Genus **Riethia** Kieffer, 1917

Riethia Kieffer, 1917, Annls. hist.-nat. Mus. natn. hung. 15: 203.
Riethia zeylandica Freeman, 1959
Riethia zeylandica Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 422.

Genus **Chironomus** Meigen, 1803

Chironomus Meigen, 1803, *In* Illiger Mag. Insektenk. 2: 260.

Subgenus **Chironomus**

Chironomus (Chironomus) zealandicus Hudson, 1892
Chironomus zealandicus Hudson, 1892, Manual N.Z. Entomology, 43.
Chironomus (Chironomus) analis Freeman, 1959
Chironomus (Chironomus) analis Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 425.

Subgenus **Dicrotendipes** Kieffer, 1913

Dicrotendipes Kieffer, 1913, *In* Voy. Alluaud & Jeannel Afr. or. Ins. Dipt. 1: 23.
Chironomus (Dicrotendipes) canterburyensis Freeman, 1959
Chironomus (Dicrotendipes) canterburyensis Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 425.

Subgenus **Cryptochironomus** Kieffer, 1918

Cryptochironomus Kieffer, 1918, Ent. Mitt. 7: 46.
Chironomus (Cryptochironomus) cylindricus Freeman, 1959
Chironomus (Cryptochironomus) cylindricus Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 425.

Genus **Harrisius** Freeman, 1959

Harrisius Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 426.
Harrisius pallidus Freeman, 1959
Harrisius pallidus Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 426.

Genus **Ophryophorus** Freeman, 1959

Ophryophorus Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 427.
Ophryophorus ramiferus Freeman, 1959
Ophryophorus ramiferus Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 428.

Genus **Paucispinigera** Freeman, 1959

Paucispinigera Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 428.
Paucispinigera approximata Freeman, 1959
Paucispinigera approximata Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 429.

Genus **Polypedilum** Kieffer, 1913

Polypedilum Kieffer, 1913, Bull. Soc. Hist. nat. Metz 28: 15.

Subgenus **Polypedilum**

Polypedilum (Polypedilum) pavidus (Hutton, 1902)
Chironomus pavidus Hutton, 1902, Trans. Proc. N.Z. Inst. 34: 183.
Polypedilum (Polypedilum) longicrus Kieffer, 1921
Polypedilum longicrus Kieffer, 1921, Annls. Soc. Sci. Bruxelles 40 (1): 101.
Polypedilum (Polypedilum) opimus (Hutton, 1902)
Chironomus opimus Hutton, 1902, Trans. Proc. N.Z. Inst. 34: 182.
Polypedilum (Polypedilum) harrisi Freeman, 1959
Polypedilum (Polypedilum) harrisi Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 433.
Polypedilum (Polypedilum) digitulus Freeman, 1959
Polypedilum (Polypedilum) digitulus Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 433.
Polypedilum (Polypedilum) cumberi Freeman, 1959
Polypedilum (Polypedilum) cumberi Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 434.
Polypedilum (Polypedilum) ignavus (Hutton, 1902)
Chironomus ignavus Hutton, 1902, Trans. Proc. N.Z. Inst. 34: 183.
Polypedilum (Polypedilum) canum Freeman, 1959
Polypedilum (Polypedilum) canum Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 434.
Polypedilum (Polypedilum) luteum Forsyth, 1971
Polypedilum (Polypedilum) luteum Forsyth, 1971, J. R. Soc. N.Z. 1 (2): 133.
Polypedilum (Polypedilum) alternans Forsyth, 1971
Polypedilum (Polypedilum) alternans Forsyth, 1971, J. R. Soc. N.Z. 1 (2): 133.

Tribe TANYTARSINI

Genus **Tanytarsus** van der Wulp, 1874

Tanytarsus van der Wulp, 1874, Tijdschr. Ent. 17: 134.

Subgenus **Tanytarsus**

Tanytarsus (Tanytarsus) vespertinus Hutton, 1902
Tanytarsus vespertinus Hutton, 1902, Trans. Proc. N.Z. Inst. 34: 185.
Tanytarsus (Tanytarsus) funebris Freeman, 1959
Tanytarsus (Tanytarsus) funebris Freeman, 1959, Bull. Br. Mus. Nat. Hist. Ent. 7 (9): 436.
Tanytarsus (Tanytarsus) albanyensis Forsyth, 1971
Tanytarsus albanyensis Forsyth, 1971, J. R. Soc. N.Z. 1 (2): 137.

Genus **Lundstroemia** Kieffer, 1921

Lundstroemia Kieffer, 1921, Annls. Soc. ent.fl Fr. 90: 36.
Lundstroemia agameta Forsyth, 1971
Lundstroemia agameta Forsyth, 1971, J. R. Soc. N.Z. 1 (2): 137.

Species dubiae

Chironomus lentus Hutton, 1902
Chironomus lentus Hutton, 1902, Trans. Proc. N.Z. Inst. 34: 182.

Family CERATOPOGONIDAE

Family SIMULIIDAE

Subfamily SIMULIINAE

Genus **Austrosimulium** Tonnoir, 1925

Austrosimulium Tonnoir, 1925, Bull. Ent. Res. 15 (3): 230.

Subgenus **Austrosimulium**

Austrosimulium (Austrosimulium) australense (Schiner, 1868)
Simulia australensis Schiner, 1868, Reise Fregatta Novara, Zool. 2 (1B) Dipt.: 15.
Austrosimulium (Austrosimulium) longicorne Tonnoir, 1925
Austrosimulium longicorne Tonnoir, 1925, Bull. Ent. Res. 15 (3): 254.
Austrosimulium (Austrosimulium) tillyardianum Dumbleton, 1973
Austrosimulium tillyardianum Dumbleton, 1973, N.Z. J. Sci. 15 (4): 513.
Austrosimulium (Austrosimulium) multicorne multicorne Tonnoir, 1925
Austrosimulium multicorne Tonnoir, 1925, Bull. Ent. Res. 15 (3): 254.
Austrosimulium (Austrosimulium) multicorne fiordense Dumbleton, 1973
Austrosimulium (Austrosimulium) multicorne fiordense Dumbleton, 1973, N.Z. J. Sci. 15 (4): 518.
Austrosimulium (Austrosimulium) laticorne laticorne Tonnoir, 1925
Austrosimulium laticorne Tonnoir, 1925, Bull. Ent. Res. 15 (3): 253.
Austrosimulium (Austrosimulium) laticorne alveolatum Dumbleton, 1973
Austrosimulium (Austrosimulium) laticorne alveolatum Dumbleton, 1973, N.Z. J. Sci. 15 (4): 522.
Austrosimulium (Austrosimulium) stewartense Dumbleton, 1973
Austrosimulium (Austrosimulium) stewartense Dumbleton, 1973, N.Z. J. Sci. 15 (4): 522.
Austrosimulium (Austrosimulium) albovelatum Dumbleton, 1973
Austrosimulium (Austrosimulium) albovelatum Dumbleton, 1973, N.Z. J. Sci. 15 (4): 524.
Austrosimulium (Austrosimulium) ungulatum Tonnoir, 1925
Austrosimulium ungulatum Tonnoir, 1925, Bull. Ent. Res. 15 (3): 250.
Austrosimulium (Austrosimulium) vexans (Mik, 1881) Auckland Is
Simulium vexans Mik, 1881, Verh. zool.-bot. Ges. Wien 31: 201.
Austrosimulium (Austrosimulium) campbellense Dumbleton, 1973 Campbell I
Austrosimulium (Austrosimulium) campbellense Dumbleton, 1973, N.Z. J. Sci. 15 (4): 535.
Austrosimulium (Austrosimulium) bicorne Dumbleton, 1973
Austrosimulium (Austrosimulium) bicorne Dumbleton, 1973, N.Z. J. Sci. 15 (4): 538.
Austrosimulium (Austrosimulium) unicorne Dumbleton, 1973
Austrosimulium (Austrosimulium) unicorne Dumbleton, 1973, N.Z. J. Sci. 15 (4): 543.

Family THAUMALEIDAE

Genus **Austrothaumalea** Tonnoir, 1927

Austrothaumalea Tonnoir, 1927, Rec. Canterbury Mus. 3 (2): 109.
Austrothaumalea neozealandica Tonnoir, 1927
Austrothaumalea neozealandica Tonnoir, 1927, Rec. Canterbury Mus. 3 (2): 110.
Austrothaumalea appendiculata Tonnoir, 1927
Austrothaumalea appendiculata Tonnoir, 1927, Rec. Canterbury Mus. 3 (2): 112.

Division BIBIOMORPHA

Family BLEPHAROCERIDAE

Subfamily APISTOMIINAE

Genus **Neocurupira** Lamb, 1913

Neocurupira Lamb, 1913, Trans. Proc. N.Z. Inst. 45: 72.

Subgenus **Neocurupira**

Neocurupira (Neocurupira) hudsoni Lamb, 1913
Neocurupira hudsoni Lamb, 1913, Trans. Proc. N.Z. Inst. 45: 73.

Neocurupira (Neocurupira) rotalapisculus Craig, 1969
Neocurupira rotalapisculus Craig, 1969, Trans. R. Soc. N.Z. Biol. Sci. 11 (9): 119.
Neocurupira (Neocurupira) campbelli Dumbleton, 1963
Neocurupira (Paracurupira) campbelli Dumbleton, 1963, N.Z. J. Sci. 6 (2): 242.
Neocurupira (Neocurupira) tonnoiri Dumbleton, 1963
Neocurupira (Paracurupira) tonnoiri Dumbleton, 1963, N.Z. J. Sci. 6 (2): 238.
Neocurupira (Neocurupira) chiltoni (Campbell, 1921)
Curupira chiltoni Campbell, 1921, Trans. Proc. N.Z. Inst. 53: 260.

Genus **Nothohoraia** Craig, 1969

Nothohoraia Craig, 1969, Trans. R. Soc. N.Z. Biol. Sci 11 (9): 132.
Nothohoraia micrognathia Craig, 1969
Nothohoraia micrognathia Craig, 1969, Trans. R. Soc. N.Z. Biol. Sci. 11 (9): 132.

Genus **Peritheates** Lamb, 1913

Peritheates Lamb, 1913, Trans. Proc. N.Z. Inst. 45: 74.
Peritheates turrifer Lamb, 1913
Peritheates turrifer Lamb, 1913, Trans. Proc. N.Z. Inst. 45: 75.
Peritheates harrisi (Campbell, 1921)
Apistomyia harrisi Campbell, 1921, Trans. Proc. N.Z. Inst. 53: 262.

Suborder BRACHYCERA
Division ORTHORRHAPHA
Superfamily TABANOIDEA
Family TABANIDAE
Family STRATIOMYIDAE
Genus **Eulalia** Meigen, 1800

Eulalia Meigen, 1800, Nouv. Classif. Mouch., 21.
Eulalia atrovirens (Bigot, 1879)
Odontomyia atrovirens Bigot, 1879, Annls. Soc. ent. Fr. 5 (9): 214.

Superfamily EMPIDOIDEA
Family EMPIDIDAE
Subfamily HEMERODROMIINAE
Genus **Monodromia** Collin, 1928

Monodromia Collin, 1928, N.Z. Empididae, 24.
Monodromia fragilis Collin, 1928
Monodromia fragilis Collin, 1928, N.Z. Empididae, 25.

Genus **Phyllodromia** Zetterstedt, 1837

Phyllodromia Zetterstedt, 1837, Isis von Oken, 1837, 31.
Phyllodromia scopulifera Collin, 1928
Phyllodromia scopulifera Collin, 1928, N.Z. Empididae, 25.
Phyllodromia striata Collin, 1928
Phylodromia striata Collin, N.Z. Empididae, 26.

Genus **Doliodromia** Collin, 1928

Doliodromia Collin, 1928, N.Z. Empididae, 27.
Doliodromia avita Collin, 1928
Doliodromia avita Collin, 1928, N.Z. Empididae, 27.

Genus **Chelipoda** Macquart, 1823

Chelipoda Macquart, 1823, Recl. Trav. Soc. amat. Sci. Lille 1: 148.
Chelipoda consignata Collin, 1928
Chelipoda consignata Collin, 1928, N.Z. Empididae, 30.
Chelipoda abdita Collin, 1928
Chelipoda abdita Collin, 1928, N.Z. Empididae, 31.
Chelipoda otiraensis (Miller, 1923)
Litanomyia otiraensis Miller, 1923, Trans. Proc. N.Z. Inst. 54: 443.
Chelipoda mirabilis Collin, 1928
Chelipoda mirabilis Collin, 1928, N.Z. Empididae, 32.
Chelipoda recurva Collin, 1928
Chelipoda recurva Collin, 1928, N.Z. Empididae, 34.
Chelipoda longicornis Collin, 1928
Chelipoda longicornis Collin, 1928, N.Z. Empididae, 34.
Chelipoda secreta Collin, 1928
Chelipoda secreta Collin, 1928, N.Z. Empididae, 35.
Chelipoda trepida Collin, 1928
Chelipoda trepida Collin, 1928, N.Z. Empididae, 35.
Chelipoda inconspicua Collin, 1928
Chelipoda inconspicua Collin, 1928, N.Z. Empididae, 36.
Chelipoda interposita Collin, 1928
Chelipoda interposita Collin, 1928, N.Z. Empididae, 37.
Chelipoda abjecta Collin, 1928
Chelipoda abjecta Collin, 1928, N.Z. Empididae, 37.
Chelipoda delecta Collin, 1928
Chelipoda delecta Collin, 1928, N.Z. Empididae, 38.
Chelipoda moderata Collin, 1928
Chelipoda moderata Collin, 1928, N.Z. Empididae, 39.
Chelipoda modica Collin, 1928
Chelipoda modica Collin, 1928, N.Z. Empididae, 39.
Chelipoda oblata Collin, 1928
Chelipoda oblata Collin, 1928, N.Z. Empididae, 40.
Chelipoda oblinita Collin, 1928
Chelipoda oblinita Collin, 1928, N.Z. Empididae, 41.
Chelipoda digressa Collin, 1931
Chelipoda digressa Collin, 1931, Ann. Mag. Nat. Hist. (10) 8: 353.

Genus **Hemerodromia** Meigen, 1822

Hemerodromia Meigen, 1822, Syst. Beschr. Zweifl. Insekt. 3: 61.
Hemerodromia radialis Collin, 1928
Hemerodromia radialis Collin, 1928, N.Z. Empididae, 42.

Genus **Chelifera** Macquart, 1823

Chelifera Macquart, 1823, Recl. Trav. Soc. amat. Sci. Lille 1: 150.
Chelifera tantula Collin, 1928
Chelifera tantula Collin, 1928, N.Z. Empididae, 43.
Chelifera apicata Collin, 1928
Chelifera apicata Collin, 1928, N.Z. Empididae, 44.
Chelifera tacita Collin, 1928
Chelifera tacita Collin, 1928, N.Z. Empididae, 44.
Chelifera fontanalis (Miller, 1923)
Hemerodromia fontanalis Miller, 1923, Trans. Proc. N.Z. Inst. 54: 442.

Genus **Neoplasta** Coquillett, 1896

Neoplasta Coquillett, 1896, Proc. U.S. Natn. Mus. 18: 389.
Neoplasta inturbida Collin, 1928
Neoplasta inturbida Collin, 1928, N.Z. Empididae, 45.

Genus **Cladodromia** Bezzi, 1905

Cladodromia Bezzi, 1905, Annls. Mus. Hung. 3: 453.
Cladodromia soleata Collin, 1928
Cladodromia soleata Collin, 1928, N.Z. Empididae, 47.
Cladodromia insignata Collin, 1928
Cladodromia insignata Collin, 1928, N.Z. Empididae, 48.
Cladodromia futilis Collin, 1928
Cladodromia futilis Collin, 1928, N.Z. Empididae, 50.
Cladodromia negata Collin, 1928
Cladodromia negata Collin, 1928, N.Z. Empididae, 50.

Genus **Sematopoda** Collin, 1928

Sematopoda Collin, 1928, N.Z. Empididae, 51.
Sematopoda elata Collin, 1928
Sematopoda elata Collin, 1928, N.Z. Empididae, 52.

Subfamily CLINOCERINAE

Genus **Dipsomyia** Bezzi, 1909

Dipsomyia Bezzi, 1909, Nova Acta Acad. Caesar. Leop. Carol. 91 (3): 388.
Dipsomyia mutabilis Collin, 1928
Dipsomyia mutabilis Collin, 1928, N.Z. Empididae, 60.

Genus **Clinocera** Meigen, 1803

Clinocera Meigen, 1803, *In* Illiger Mag. Insektenk. 2: 271.
Clinocera gressitti Smith, 1964 Campbell I
Clinocera gressitti Smith, 1964, Pacific Insects Monogr. 7: 327.

Division CYCLORRHAPHA

Series ASCHIZA

Superfamily SYRPHOIDEA

Family SYRPHIDAE

Genus **Eristalis** Latreille, 1804

Eristalis Latreille, 1804, Nouv. Dict. H.N. 24 (Tab.): 194.
Eristalis tenax (Linnaeus 1758)
Musca tenax Linnaeus, 1758, Syst. Nat. Ed. 10: 591.

Genus **Helophilus** Meigen, 1822

Helophilus Meigen, 1822, Syst. Beschr. Zweifl. Insekt. 3: 368.
Helophilus antipodus Schiner, 1868 NZ, Auckland Is, Campbell I
Helophilus antipodus Schiner, 1868, Reise Fregatta Novara Zool. 2 (1B) Dipt.: 359.
Helophilus campbellicus Hutton, 1902 Campbell I
Helophilus campbellicus Hutton, 1902, Trans. Proc. N.Z. Inst. 34: 170.
Helophilus cargilli Miller, 1911
Helophilus cargilli Miller, 1911, Trans. N.Z. Inst. 43: 126.
Helophilus chathamensis Hutton, 1901 Chatham Is
Helophilus chathamensis Hutton, 1901, Trans. Proc. N.Z. Inst. 33: 39.

Helophilus hectori Miller, 1924
Helophilus hectori Miller, 1924, Trans. Proc. N.Z. Inst. 55: 283.
Helophilus hochstetteri Nowicki, 1875
Helophilus hochstetteri Nowicki, 1875, Mem. Krakauer Akad. Wissen 2: 23.
Helophilus ineptus Walker, 1849
Helophilus ineptus Walker, 1849, List dipterous insects Br. Mus. Part 3: 608.
Helophilus taruensis Miller, 1924
Helophilus taruensis Miller, 1924, Trans. Proc. N.Z. Inst. 55: 283.
Helophilus trilineatus (Fabricius, 1775)
Syrphus trilineatus Fabricius, 1775, Syst. Ent., 766.

Series SCHIZOPHORA
Superfamily DROSOPHILOIDEA
Family EPHYDRIDAE
Subfamily EPHYDRINAE
Genus **Brachydeutera** Loew, 1862

Brachydeutera Loew, 1862, Monogr. Dipt. N. Am. 1: 162.
Brachydeutera sydneyensis Malloch, 1924
Brachydeutera sydneyensis Malloch, 1924, Proc. Linn. Soc. N.S.W. 49: 335.

Genus **Neoscatella** Malloch, 1935

Neoscatella Malloch, 1935, Bull. Bernice P. Bishop Mus. 114: 9.
Neoscatella vittithorax Malloch, 1925
Neoscatella vittithorax Malloch, 1925, Proc. Linn. Soc. N.S.W. 50: 331.

Genus **Ephydrella** Tonnoir and Malloch, 1926

Ephydra (Ephydrella) Tonnoir & Malloch, 1926, Rec. Canterbury Mus. 3 (1): 6.
Ephydrella aquaria (Hutton, 1901)
Ephydra aquaria Hutton, 1901, Trans. Proc. N.Z. Inst. 33: 90.
Ephydrella novaezealandiae (Tonnoir and Malloch, 1926)
Ephydra novaezealandiae Tonnoir & Malloch, 1926, Rec. Canterbury Mus. 3 (1): 8.
Ephydrella thermarum Dumbleton, 1969
Ephydrella thermarum Dumbleton, 1969, N.Z. Ent. 4 (2): 39.

Genus **Ephydra** Fallén, 1810

Ephydra Fallén, 1810, Sp. Ent. nov. Dipt., 22.
Ephydra macquariensis Womersley, 1937 Macquarie I
Ephydra macquariensis Womersley, 1937, Br. Aust. N.Z. Antarct. Res. Exped. Rep. (B) 4 (3): 77.

Superfamily MUSCOIDEA
Family MUSCIDAE

Order TRICHOPTERA
Suborder ANNULIPALPIA
Superfamily HYDROPSYCHOIDEA
Family HYDROPSYCHIDAE
Subfamily HYDROPSYCHINAE Ulmer, 1903
Genus **Hydropsyche** Pictet, 1834

Hydropsyche Pictet, 1834, Recherch. Phryg., 199.
Hydropsyche fimbriata McLachlan, 1862
Hydropsyche fimbriata McLachlan, 1862, Trans. Ent. Soc. London (3) 1: 309.

Hydropsyche thomasi Wise, 1962
Hydropysche thomasi Wise, 1962, Rec. Auckland Inst. Mus. 5 (5, 6): 248.
Hydropsyche colonica McLachlan, 1871
Hydropsyche colonica McLachlan, 1871, J. Linn. Soc. London Zool. 11: 131.
Hydropsyche rarurara McFarlane, 1973
Hydropsyche rarurara McFarlane, 1973, J. R. Soc. N.Z. 3 (1): 30.
Hydropsyche tepoka Mosely, 1953
Hydropsyche tepoka Mosely, 1953, Trichoptera Aust. & N.Z., 320.
Hydropsyche tipua McFarlane, 1964
Hydropsyche tipua McFarlane, 1964, Rec. Canterbury Mus. 8 (1): 59.
Hydropsyche auricoma Hare, 1910
Hydropsyche auricoma Hare, 1910, Trans. Proc. N.Z. Inst. 42: 32.
Hydropsyche occulta (Hare, 1910)
Hydrobiosis occulta Hare, 1910, Trans. Proc. N.Z. Inst. 42: 32.
Hydropsyche philpotti Tillyard, 1924
Hydropsyche philpotti Tillyard, 1924, Trans. Proc. N.Z. Inst. 55: 301.
Hydropsyche catherinae McFarlane, 1960
Hydropsyche catherinae McFarlane, 1960, Rec. Canterbury Mus. 7 (3): 207.

Subfamily DIPLECTRONINAE Ulmer

Genus **Diplectrona** Westwood, 1840

Diplectrona Westwood, 1840, Intro. mod. class. Ins. 2 Gen. Syn.: 49.
Diplectrona zealandensis Mosely, 1953
Diplectrona zealandensis Mosely, 1953, Trichoptera Aust. & N.Z., 340.
Diplectrona bulla Wise, 1958
Diplectrona bulla Wise, 1958, Rec. Auckland Inst. Mus. 5 (1, 2): 56.

Family POLYCENTROPODIDAE

Genus **Plectrocnemia** Stephens, 1836

Plectrocnemia Stephens, 1836, Illustrations British Ent. Mandibulata 6: 168.
Plectrocnemia maclachlani Mosely, 1953
Plectrocnemia maclachlani Mosely, 1953, Trichoptera Aust. & N.Z., 355.

Genus **Polyplectropus** Ulmer, 1905

Polyplectropus Ulmer, 1905, Stettin. ent. Ztg. 66: 103.
Polyplectropus puerilis (McLachlan, 1868)
Polycentropus puerilis McLachlan, 1868, J. Linn. Soc. London Zool. 10: 204.
Polyplectropus waitakerensis Wise, 1962
Polyplectropus waitakerensis Wise, 1962, Rec. Auckland Inst. Mus. 5 (5, 6): 249.
Polyplectropus impluvii Wise, 1962
Polyplectropus impluvii Wise, 1962, Rec. Auckland Inst. Mus. 5 (5, 6): 249.
Polyplectropus aurifusca McFarlane, 1956
Polyplectropus aurifusca McFarlane, 1956, Rec. Canterbury Mus. 7 (1): 34.
Polyplectropus puhia McFarlane, 1956
Polyplectropus puhia McFarlane, 1956, Rec. Canterbury Mus. 7 (1): 36.

Family PSYCHOMYIIDAE

Subfamily ECNOMINAE Ulmer, 1907

Genus **Ecnomina** Kimmins, 1953

Ecnomina Kimmins, 1953, Trichoptera Aust. & N.Z., 380.
Ecnomina zealandica Wise, 1958
Ecnomina zealandica Wise, 1958, Rec. Auckland Inst. Mus. 5 (1, 2): 57.

Subfamily PSYCHOMYIINAE Ulmer, 1907

Genus **Zelandoptila** Tillyard, 1924

Zelandoptila Tillyard, 1924, Trans. Proc. N.Z. Inst. 55: 300.
Zelandoptila moselyi Tillyard, 1924
Zelandoptila moselyi Tillyard, 1924, Trans. Proc. N.Z. Inst. 55: 301.

Family PHILOPOTAMIDAE

Genus **Dolophilodes** Ulmer, 1909

Dolophilodes Ulmer, 1909, Notes Leyden Mus. 31: 125.

Subgenus **Hydrobiosella** Tillyard, 1924

Hydrobiosella Tillyard, 1924, Trans. Proc. N.Z. Inst. 55: 288.
Dolophilodes (Hydrobiosella) stenocerca (Tillyard, 1924)
Hydrobiosella stenocerca Tillyard, 1924, Trans. Proc. N.Z. Inst. 55: 289.
Dolophilodes (Hydrobiosella) tonela (Mosely, 1953)
Zelobiosella tonela Mosely, 1953, Trichoptera Aust. & N.Z., 397.

Genus **Neobiosella** Wise, 1958

Neobiosella Wise, 1958, Rec. Auckland Inst. Mus. 5 (1, 2): 57.
Neobiosella irrorata Wise, 1958
Neobiosella irrorata Wise, 1958, Rec. Auckland Inst. Mus. 5 (1, 2): 58.

Suborder INTEGRIPALPIA

Superfamily RHYACOPHILOIDEA

Family RHYACOPHILIDAE

Subfamily HYDROBIOSINAE Ulmer, 1905

Genus **Hydrobiosis** McLachlan, 1868

Hydrobiosis McLachlan, 1868, J. Linn. Soc. London Zool. 10: 206.
Hydrobiosis styx McFarlane, 1951
Hydrobiosis styx McFarlane, 1951, Rec. Canterbury Mus. 5 (5): 260.
Hydrobiosis spatulata McFarlane, 1951
Hydrobiosis spatulata McFarlane, 1951, Rec. Canterbury Mus. 5 (5): 258.
Hydrobiosis gollanis Mosely, 1953
Hydrobiosis gollanis Mosely, 1953, Trichoptera Aust. & N.Z., 408.
Hydrobiosis umbripennis McLachlan, 1868
Hydrobiosis umbripennis McLachlan, 1868, J. Linn. Soc. London Zool. 10: 208.
Hydrobiosis parumbripennis McFarlane, 1951
Hydrobiosis parumbripennis McFarlane, 1951, Rec. Canterbury Mus. 5 (5): 256.
Hydrobiosis falcis Wise, 1958
Hydrobiosis falcis Wise, 1958, Rec. Auckland Inst. Mus. 5 (1, 2): 58.
Hydrobiosis lindsayi Tillyard, 1925 Chatham Is
Hydrobiosis lindsayi Tillyard, 1925, Rec. Canterbury Mus. 2 (5): 277.
Hydrobiosis budgei McFarlane, 1960
Hydrobiosis budgei McFarlane, 1960, Rec. Canterbury Mus. 7 (3): 210.
Hydrobiosis copis McFarlane, 1960
Hydrobiosis copis McFarlane, 1960, Rec. Canterbury Mus. 7 (3): 210.
Hydrobiosis styracine McFarlane, 1960
Hydrobiosis styracine McFarlane, 1960, Rec. Canterbury Mus. 7 (3): 212.
Hydrobiosis silvicola McFarlane, 1951
Hydrobiosis silvicola McFarlane, 1951, Rec. Canterbury Mus. 5 (5): 258.

Hydrobiosis kiddi McFarlane, 1951
Hydrobiosis kiddi McFarlane, 1951, Rec. Canterbury Mus. 5 (5): 257.
Hydrobiosis harpidiosa McFarlane, 1951
Hydrobiosis harpidiosa McFarlane, 1951, Rec. Canterbury Mus. 5 (5): 257.
Hydrobiosis frater McLachlan, 1868
Hydrobiosis frater McLachlan, 1868, J. Linn. Soc. London Zool. 10: 207.
Hydrobiosis soror Mosely, 1953
Hydrobiosis soror Mosely, 1953, Trichoptera Aust. & N.Z., 421.
Hydrobiosis clavigera McFarlane, 1951
Hydrobiosis clavigera McFarlane, 1951, Rec. Canterbury Mus. 5 (5): 259.
Hydrobiosis charadraea McFarlane, 1951
Hydrobiosis charadraea McFarlane, 1951, Rec. Canterbury Mus. 5 (5): 259.
Hydrobiosis ingenua Hare, 1910
Hydrobiosis ingenua Hare, 1910, Trans. N.Z. Inst. 42. 33.

Genus **Psilochorema** McLachlan, 1866

Psilochorema McLachlan, 1866, Trans. Ent. Soc. London (3) 5: 273.
Psilochorema mimicum McLachlan, 1866
Psilochorema mimicum McLachlan, 1866, Trans. Ent. Soc. London (3) 5: 274.
Psilochorema vomerharpax McFarlane, 1964
Psilochorema vomerharpax McFarlane, 1964, Rec. Canterbury Mus. 8 (1): 61.
Psilochorema tautoru McFarlane, 1964
Psilochorema tautoru McFarlane, 1964, Rec. Canterbury Mus. 8 (1): 62.
Psilochorema nemorale McFarlane, 1951
Psilochorema nemorale McFarlane, 1951, Rec. Canterbury Mus. 5 (5): 262.
Psilochorema macroharpax McFarlane, 1951
Psilochorema macroharpax McFarlane, 1951, Rec. Canterbury Mus. 5 (5): 263.
Psilochorema bidens McFarlane, 1951
Psilochorema bidens McFarlane, 1951, Rec. Canterbury Mus. 5 (5): 262.
Psilochorema mataura McFarlane, 1956
Psilochorema mataura McFarlane, 1956, Rec. Canterbury Mus. 7 (1): 39.
Psilochorema leptoharpax McFarlane, 1951
Psilochorema leptoharpax McFarlane, 1951, Rec. Canterbury Mus. 5 (5): 261.
Psilochorema donaldsoni McFarlane, 1960
Psilochorema donaldsoni McFarlane, 1960, Rec. Canterbury Mus. 7 (3): 213.
Psilochorema folioharpax McFarlane, 1956
Psilochorema folioharpax McFarlane, 1956, Rec. Canterbury Mus. 7 (1): 40.

Genus **Edpercivalia** McFarlane, 1964

Edpercivalia McFarlane, 1964, Rec. Canterbury Mus. 8 (1): 72.
Edpercivalia cassicola (McFarlane, 1939)
Percivalia cassicola McFarlane, 1939, Trans. Proc. R. Soc. N.Z. 69: 333.
Edpercivalia maxima (McFarlane, 1939)
Percivalia maxima McFarlane, 1939, Trans. Proc. R. Soc. N.Z. 69: 331.
Edpercivalia fusca (McFarlane, 1939)
Percivalia fusca McFarlane, 1939, Trans. Proc. R. Soc. N.Z. 69: 332.
Edpercivalia shandi (McFarlane, 1951)
Percivalia shandi McFarlane, 1951, Rec. Canterbury Mus. 5 (5): 263.
Edpercivalia banksiensis (McFarlane, 1939)
Percivalia banksiensis McFarlane, 1939, Trans. Proc. R. Soc. N.Z. 69: 234.
Edpercivalia borealis (McFarlane, 1951)
Percivalia borealis McFarlane, 1951, Rec. Canterbury Mus. 5 (5): 264.

Edpercivalia thomasoni (McFarlane, 1960)
Notiobiosis thomasoni McFarlane, 1960, Rec. Canterbury Mus. 7 (3): 214.
Edpercivalia spaini McFarlane, 1973
Edpercivalia spaini McFarlane, 1973, J. R. Soc. N.Z. 3 (1): 34.

Genus **Synchorema** Tillyard, 1924

Synchorema Tillyard, 1924, Trans. Proc. N.Z. Inst. 55: 296.
Synchorema zygoneura Tillyard, 1924
Synchorema zygoneura Tillyard, 1924, Trans. Proc. N.Z. Inst. 55: 297.
Synchorema tillyardi McFarlane, 1964
Synchorema tillyardi McFarlane, 1964, Rec. Canterbury Mus. 8 (1): 71.

Genus **Neurochorema** Tillyard, 1924

Neurochorema Tillyard, 1924, Trans. Proc. N.Z. Inst. 55: 290.
Neurochorema confusum (McLachlan, 1868)
Psilochorema confusum McLachlan, 1868, J. Linn. Soc. London Zool. 10: 210.
Neurochorema armstrongi McFarlane, 1951
Neurochorema armstrongi McFarlane, 1951, Rec. Canterbury Mus. 5 (5): 254.
Neurochorema pilosum McFarlane, 1964
Neurochorema pilosum McFarlane, 1964, Rec. Canterbury Mus. 8 (1): 67.
Neurochorema forsteri McFarlane, 1964
Neurochorema forsteri McFarlane, 1964, Rec. Canterbury Mus. 8 (1): 68.

Genus **Hydrochorema** Tillyard, 1924

Hydrochorema Tillyard, 1924, Trans. Proc. N.Z. Inst. 55: 202.
Hydrochorema crassicaudatum Tillyard, 1924
Hydrochorema crassicaudatum Tillyard, 1924, Trans. Proc. N.Z. Inst. 55: 293.
Hydrochorema tenuicaudatum Tillyard, 1924
Hydrochorema tenuicaudatum Tillyard, 1924, Trans. Proc. N.Z. Inst. 55: 295.

Genus **Atrachorema** McFarlane, 1964

Atrachorema McFarlane, 1964, Rec. Canterbury Mus. 8 (1): 62.
Atrachorema mangu McFarlane, 1964
Atrachorema mangu McFarlane, 1964, Rec. Canterbury Mus. 8 (1): 63.
Atrachorema tuarua McFarlane, 1966
Atrachorema tuarua McFarlane, 1966, Rec. Canterbury Mus. 8 (2): 158.

Genus **Costachorema** McFarlane, 1939

Costachorema McFarlane, 1939, Trans. Proc. R. Soc. N.Z. 69: 335.
Costachorema callistum McFarlane, 1939
Costachorema callistum McFarlane, 1939, Trans. Proc. R. Soc. N.Z. 69: 337.
Costachorema brachyptera McFarlane, 1939
Costachorema brachyptera McFarlane, 1939, Trans. Proc. R. Soc. N.Z. 69: 338.
Costachorema xanthoptera McFarlane, 1939
Costachorema xanthoptera McFarlane, 1939, Trans. Proc. R. Soc. N.Z. 69: 336.
Costachorema psaroptera McFarlane, 1939
Costachorema psaroptera McFarlane, 1939, Trans. Proc. R. Soc. N.Z. 69: 335.
Costachorema notoptera Wise, 1972 Auckland Is
Costachorema notoptera Wise, 1972, Rec. Auckland Inst. Mus. 9: 253.

Genus **Tiphobiosis** Tillyard, 1924

Tiphobiosis Tillyard, 1924, Trans. Proc. N.Z. Inst. 55: 298.

Tiphobiosis montana Tillyard, 1924
Tiphobiosis montana Tillyard, 1924, Trans. Proc. N.Z. Inst. 55: 299.
Tiphobiosis fulva Tillyard, 1924
Tiphobiosis fulva Tillyard, 1924, Trans. Proc. N.Z. Inst. 55: 300.
Tiphobiosis intermedia Mosely, 1953
Tiphobiosis intermedia Mosely, 1953, Trichoptera Aust. & N.Z., 491.
Tiphobiosis veniflex McFarlane, 1960
Tiphobiosis veniflex McFarlane, 1960, Rec. Canterbury Mus. 7 (3): 216.
Tiphobiosis plicosta McFarlane, 1960
Tiphobiosis plicosta McFarlane, 1960, Rec. Canterbury Mus. 7 (3): 217.
Tiphobiosis kuscheli Wise, 1972 Auckland Is
Tiphobiosis kuscheli Wise, 1972, Rec. Auckland Inst. Mus. 9: 258.

Family HYDROPTILIDAE

Genus **Oxyethira** Eaton, 1873

Oxyethira Eaton, 1873, Trans. Ent. Soc. London 1873: 143.
Oxyethira albiceps (McLachlan, 1862) NZ, Chatham Is, Auckland Is, Campbell I
Hydroptila albiceps McLachlan, 1862, Trans. Ent. Soc. London (3) 1: 304.

Genus **Paroxyethira** Mosely, 1924

Paroxyethira Mosely, 1924, Trans. Proc. N.Z. Inst. 55: 670.
Paroxyethira hendersoni Mosely, 1924
Paroxyethira hendersoni Mosely, 1924, Trans. Proc. N.Z. Inst. 55: 673.
Paroxyethira eatoni Mosely, 1924
Paroxyethira eatoni Mosely, 1924, Trans. Proc. N.Z. Inst. 55: 673.
Paroxyethira tillyardi Mosely, 1924
Paroxyethira tillyardi Mosely, 1924, Trans. Proc. N.Z. Inst. 55: 670.
Paroxyethira hintoni Leader, 1972
Paroxyethira hintoni Leader, 1972, J. Ent. (B) 41 (2): 191.
Paroxyethira kimminsi Leader, 1972
Paroxyethira kimminsi Leader, 1972, J. Ent. (B) 41 (2): 194.

Superfamily LIMNEPHILOIDEA

LIMNEPHILID branch

Family KOKIRIIDAE McFarlane, 1964

(= Rhynchopsychidae Ross, 1967)

Genus **Kokiria** McFarlane, 1964

Kokiria McFarlane, 1964, Rec. Canterbury Mus. 8 (1): 73.
Kokiria miharo McFarlane, 1964
Kokiria miharo McFarlane, 1964, Rec. Canterbury Mus. 8 (1): 79.

LEPTOCERID branch

Family PYCNOCENTRELLIDAE Ross, 1967

Genus **Pycnocentrella** Mosely, 1953

Pycnocentrella Mosely, 1953, Trichoptera Aust. & N.Z., 145.
Pycnocentrella eruensis Mosely, 1953
Pycnocentrella eruensis Mosely, 1953, Trichoptera Aust. & N.Z., 145.

Genus **Alloecentrella** Wise, 1958

Alloecentrella Wise, 1958, Rec. Auckland Inst. Mus. 5 (1, 2): 53.
Alloecentrella magnicornis Wise, 1958
Alloecentrella magnicornis Wise, 1958, Rec. Auckland Inst. Mus. 5 (1, 2): 53.

Family SERICOSTOMATIDAE

Genus **Pycnocentria** McLachlan, 1866

Pycnocentria McLachlan, 1866, Trans. Ent. Soc. London (3) 5: 251.
Pycnocentria funerea McLachlan, 1866
Pycnocentria funerea McLachlan, 1866, Trans. Ent. Soc. London (3) 5: 252.
Pycnocentria evecta McLachlan, 1868
Pycnocentria evecta McLachlan, 1868, J. Linn. Soc. London Zool. 10: 199.
Pycnocentria forcipata Mosely, 1953
Pycnocentria forcipata Mosely, 1953, Trichoptera Aust. & N.Z., 38.
Pycnocentria hawdonia McFarlane, 1956
Pycnocentria hawdonia McFarlane, 1956, Rec. Canterbury Mus. 7 (1): 30.
Pycnocentria sylvestris McFarlane, 1973
Pycnocentria sylvestris McFarlane, 1973, J. R. Soc. N.Z. 3 (1): 25.

Genus **Beraeoptera** Mosely, 1953

Beraeoptera Mosely, 1953, Trichoptera Aust. & N.Z., 52.
Beraeoptera roria Mosely, 1953
Beraeoptera roria Mosely, 1953, Trichoptera Aust. & N.Z., 53.

Genus **Pycnocentrodes** Tillyard, 1924

Pycnocentrodes Tillyard, 1924, Trans. Proc. N.Z. Inst. 55: 307.
Pycnocentrodes chiltoni Tillyard, 1924
Pycnocentrodes chiltoni Tillyard, 1924, Trans. Proc. N.Z. Inst. 55: 309.
Pycnocentrodes aureola (McLachlan, 1868)
Pycnocentria aureola McLachlan, 1868, J. Linn. Soc. London Zool. 10: 200.
Pycnocentrodes aeris Wise, 1958
Pycnocentrodes aeris Wise, 1958, Rec. Auckland Inst. Mus. 5 (1, 2): 50.
Pycnocentrodes unicolor Wise, 1958
Pycnocentrodes unicolor Wise, 1958, Rec. Auckland Inst. Mus. 5 (1, 2): 50.

Genus **Confluens** Wise, 1962

Confluens Wise, 1962, Rec. Auckland Inst. Mus. 5 (5, 6): 247.
Confluens hamiltoni (Tillyard, 1924)
Pycnocentrodes hamiltoni Tillyard, 1924, Trans. Proc. N.Z. Inst. 55: 311.
Confluens olingoides (Tillyard, 1924)
Pycnocentrodes olingoides Tillyard, 1924, Trans. Proc. N.Z. Inst. 55: 310.

Genus **Periwinkla** McFarlane, 1973

Periwinkla McFarlane, 1973, J. R. Soc. N.Z. 3 (1): 23.
Periwinkla childi McFarlane, 1973
Periwinkla childi McFarlane, 1973, J. R. Soc. N.Z. 3 (1): 24.

Genus **Conuxia** McFarlane, 1966

Conuxia McFarlane, 1966, Rec. Canterbury Mus. 8 (2): 141.
Conuxia gunni (McFarlane, 1956)
Conia gunni McFarlane, 1956, Rec. Canterbury Mus. 7 (1): 31.

Genus **Olinga** McLachlan, 1894

Olinga McLachlan, 1894, Ent. Mon. Mag. 30: 240.
Olinga feredayi (McLachlan, 1868)
Olinx feredayi McLachlan, 1868, J. Linn. Soc. London Zool. 10: 198.

Olinga fumosa Wise, 1958
Olinga fumosa Wise, 1958, Rec. Auckland Inst. Mus. 5 (1, 2): 52.
Olinga jeanae McFarlane, 1966
Olinga jeanae McFarlane, 1966, Rec. Canterbury Mus. 8 (2): 144.

Tribe OECONESINI Tillyard, 1921

Genus **Oeconesus** McLachlan, 1862

Oeconesus McLachlan, 1862, Trans. Ent. Soc. London (3) 1: 303.
Oeconesus maori McLachlan, 1862
Oeconesus maori McLachlan, 1862, Trans. Ent. Soc. London (3) 1: 303.
Oeconesus lobatus Wise, 1958
Oeconesus lobatus Wise, 1958, Rec. Auckland Inst. Mus. 5 (1, 2): 51.
Oeconesus similis Mosely, 1953
Oeconesus similis Mosely, 1953, Trichoptera Aust. & N.Z., 103.
Oeconesus incisus Mosely, 1953
Oeconesus incisus Mosely, 1953, Trichoptera Aust. & N.Z., 104.

Genus **Pseudoeconesus** McLachlan, 1894

Pseudoeconesus McLachlan, 1894, Ent. Mon. Mag. 30: 239.
Pseudoeconesus stramineus McLachlan, 1894
Pseudoeconesus stramineus McLachlan, 1894, Ent. Mon. Mag. 30: 240.
Pseudoeconesus bistirpis Wise, 1958
Pseudoeconesus bistirpis Wise, 1958, Rec. Auckland Inst. Mus. 5 (1, 2): 52.
Pseudoeconesus tristirpis Wise, 1958
Pseudoeconesus tristirpis Wise, 1958, Rec. Auckland Inst. Mus. 5 (1, 2): 52.
Pseudoeconesus squamosus Mosely, 1953
Pseudoeconesus squamosus Mosely, 1953, Trichoptera Aust. & N.Z., 112.
Pseudoeconesus hudsoni Mosely, 1953
Pseudoeconesus hudsoni Mosely, 1953, Trichoptera Aust. & N.Z., 112.
Pseudoeconesus mimus McLachlan, 1894
Pseudoeconesus mimus McLachlan, 1894, Ent. Mon. Mag. 30: 239.
Pseudoeconesus karoriensis Mosely, 1953
Pseudoeconesus karoriensis Mosely, 1953, Trichoptera Aust. & N.Z., 116.

Genus **Tarapsyche** McFarlane, 1960

Tarapsyche McFarlane, 1960, Rec. Canterbury Mus. 7 (3): 204.
Tarapsyche olis McFarlane, 1960
Tarapsyche olis McFarlane, 1960, Rec. Canterbury Mus. 7 (3): 205.

Genus **Zelandopsyche** Tillyard, 1921

Zelandopsyche Tillyard, 1921, Trans. Proc. N.Z. Inst. 53: 348.
Zelandopsyche ingens Tillyard, 1921
Zelandopsyche ingens Tillyard, 1921, Trans. Proc. N.Z. Inst. 53: 349.

Genus **Zepsyche** McFarlane, 1960

Zepsyche McFarlane, 1960, Rec. Canterbury Mus. 7 (3): 205.
Zepsyche acinaces McFarlane, 1960
Zepsyche acinaces McFarlane, 1960, Rec. Canterbury Mus. 7 (3): 206.

Family HELICOPHIDAE

Genus **Zelolessica** McFarlane, 1956

Zelolessica McFarlane, 1956, Rec. Canterbury Mus. 7 (1): 33.
Zelolessica cheira McFarlane, 1956
Zelolessica cheira McFarlane, 1956, Rec. Canterbury Mus. 7 (1): 33.

Family PHILANISIDAE

Genus **Philanisus** Walker, 1852

Philanisus Walker, 1852, Cat. neuropterous insects Br. Mus. Part 1: 115.
Philanisus plebeius Walker, 1852
Philanisus plebeius Walker, 1852, Cat. neuropterous insects Br. Mus. Part 1: 116.

Genus **Chathamia** Tillyard, 1925

Chathamia Tillyard, 1925, Rec. Canterbury Mus. 2 (5): 279.
Chathamia brevipennis Tillyard, 1925 Chatham Is
Chathamia brevipennis Tillyard, 1925, Rec. Canterbury Mus. 2 (5): 280.

Family PHILORHEITHRIDAE

Genus **Philorheithrus** Hare, 1910

Philorheithous Hare, 1910, Trans. N.Z. Inst. 42: 32.
Philorheithrus agilis (Hudson, 1904)
Pseudoeconesus (?) agilis Hudson, 1904, N.Z. Neuroptera, 64.
Philorheithrus lacustris Tillyard, 1924
Philorheithrus lacustris Tillyard, 1924, Trans. Proc. N.Z. Inst. 55: 305.

Family HELICOPSYCHIDAE

Genus **Helicopsyche** Hagen, 1866

Helicopsyche Hagen, 1866, Ent. Mon. Mag. 2: 252.
Helicopsyche zealandica Hudson, 1904
Helicopsyche zealandica Hudson, 1904, N.Z. Neuroptera, 70.
Helicopsyche poutini McFarlane, 1964
Helicopsyche poutini McFarlane, 1964, Rec. Canterbury Mus. 8 (1): 55.
Helicopsyche albescens Tillyard, 1924
Helicopsyche albescens Tillyard, 1924, Trans. Proc. N.Z. Inst. 55: 312.
Helicopsyche howesi Tillyard, 1924
Helicopsyche howesi Tillyard, 1924, Trans. Proc. N.Z. Inst. 55: 313.

Genus **Rakiura** McFarlane, 1973

Rakiura McFarlane, 1973, J. R. Soc. N.Z. 3 (1): 26.
Rakiura vernale McFarlane, 1973
Rakiura vernale McFarlane, 1973, J. R. Soc. N.Z. 3 (1): 27.

Family LEPTOCERIDAE

Subfamily TRIPLECTIDINAE Ulmer, 1906

Genus **Triplectides** Kolenati, 1859

Triplectides Kolenati, 1859, Gen. et. spec. Trich. 2: 247.
Triplectides magna (Walker, 1852)
Leptocerus magnus Walker, 1852, Cat. neuropterous insects Br. Mus. Part 1: 73.
Triplectides cephalotes (Walker, 1852)
Leptocerus cephalotes Walker, 1852, Cat. neuropterous insects Br. Mus. Part 1: 73.
Triplectides obsoleta (McLachlan, 1862)
Pseudonema obsoleta McLachlan, 1862, Trans. Ent. Soc. London (3) 1: 305.

Genus **Triplectidina** Mosely, 1936

Triplectidina Mosely, 1936, Trans. R. Ent. Soc. London 85: 107.
Triplectidina oreolimnetes (Tillyard, 1924)
Triplectides oreolimnetes Tillyard, 1924, Trans. Proc. N.Z. Inst. 55: 306.

Genus **Hudsonema** Mosely, 1936

Hudsonema Mosely, 1936, Trans. R. Ent. Soc. London 85: 110.
Hudsonema amabilis (McLachlan, 1868)
Tetracentron amabile McLachlan, 1868, J. Linn. Soc. London Zool. 10: 201.
Hudsonema aliena (McLachlan, 1868)
Leptocerus (?) alienus McLachlan, 1868, J. Linn. Soc. London Zool. 10: 202.

Subfamily LEPTOCERINAE Ulmer, 1903

Genus **Oecetis** McLachlan, 1877

Oecetis McLachlan, 1877, Revision Synopsis Trichoptera European Fauna, 329.
Oecetis unicolor (McLachlan, 1868)
Setodes unicolor McLachlan, 1868, J. Linn. Soc. London Zool. 10: 203.
Oecetis chathamensis Tillyard, 1925 Chatham Is
Oecetis chathamensis Tillyard, 1925, Rec. Canterbury Mus. 2 (5): 277.
Oecetis iti McFarlane, 1964
Oecetis iti McFarlane, 1964, Rec. Canterbury Mus. 8 (1): 57.

Order LEPIDOPTERA

Suborder DITRYSIA

Superfamily PYRALOIDEA

Family PYRALIDAE

Subfamily NYMPHULINAE

Genus **Nymphula** Schrank, 1802

Nymphula Schrank, 1802, F. Boica 2 (2): 162.
Nymphula nitens (Butler, 1880)
Paraponyx nitens Butler, 1880, Cist. Ent. 2: 556.

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INDEX TO VOLUME 10

Acaena agnipila 102
Acaena agnipila var. *aequispina* 102
Acaena agnipila var. *protenta* 103
Acaena agnipila var. *tenuispica* 104
Acaena × *anserovina* 105
Acaena echinata var. *echinata* 98
Acaena ovina complex 97
Adzes 6
Alpinia speciosa 115
Benthovoluta 126
Benthovoluta barthelowi 127
Benthovoluta chaunax 127
Benthovoluta costata 129
Benthovoluta gracilior 129
Benthovoluta hilgendorfi 126
Benthovoluta meekiana 127
Bowls 59
Brachychilus horsfieldii 115
Britton, E. B.
Hyphalus wisei sp. n., a new intertidal beetle from New Zealand (Coleoptera: Limnichidae) 119
Ceratonxancus 130
Ceratonxancus elongatus 131
Ceratonxancus teramachii 131
Cernohorsky, W. O.
Description of new West Australian Mitridae and Vexillidae (Mollusca: Gastropoda) 133
The taxonomy of *Benthovoluta hilgendorfi* (von Martens) and and allied turbinellid genera (Mollusca: Volutacea) 123
Curcuma roscoeana 115
Eastern Solomon Islands 69
Fishhooks 43
Flake tools 25
Gastropoda 133
Godstick 65
Gupuna 69
Hedychium coronarium var. *maximum* 115
Hedychium coronarium var. *subditum* 109
Hedychium densiflorum 115
Hedychium gardnerianum 112
Hedychium gracile 116
Hedychium greenii 116
Hedychium luteum 116
Hedychium speciosum 116

Hedychium venustum 116
Hyphalus insularis 119
Hyphalus wisei 119
Initiation 69
Insecta
aquatic, semi-aquatic, water-associated 143
intertidal 119
Mead, S. M.
The last initiation ceremony at Gupuna, Santa Ana, Eastern Solomon Islands 69
Metzgeria 124
Metzgeria alba 124
Metzgeria decorata 125
Mitridae 133
Mollusca 123, 133
Orchard, A. E.
The *Acaena ovina* (Rosaceae) complex in New Zealand 97
Zingiberaceae in New Zealand 109
Prehistory 1
Ptychatractus 123
Ptychatractus californicus 124
Ptychatractus ligatus 124
Ptychatractus occidentalis 124
Rosaceae 97
Roscoea cautleoides 116
Scabricola barrywilsoni 135
Scabricola (Scabricola) backae 133
Scabricola (Swainsonia) ocellata ekerae 135
Simmons, D. R.
Anthropomorphic and zoomorphic Maori bowls from Hauraki and the Bay of Plenty 59
"Godstick" head from Katikati 65
Suggested periods in South Island prehistory 1
Surculina 129
Surculina blanda 129
Sunrculina cortezi 129
Surculina expeditionis 130
Surculina galapagana 130
Turbinellidae 123
Vexillidae 137
Vexillum (Pusia) hansenae 138
Vexillum (Pusia) marrowi 140
Vexillum (Pusia) microzonias 142
Volutacea 123
West Australian Mollusca 133
Wise, K. A. J.
A list and bibliography of the aquatic and water-associated insects of New Zealand 143
Zingiberaceae 109
Zingiber officinale 116

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